

STRUCTURE OF THIS MICROCARD (BASIC INSTRUCTIONS)

A02 = How to use this microcard	1	2	3	4
A01 = Structure of microcard			SIS	
B01 = Trouble-shooting chart	-A-***X*	X*XXX	XXXXX	XXXXX *XXXX X
	-B-*XXXX	XXXXX	XXXXX	XXXXX XXX
	C-XXXXX	XXXXX	XXXXX	XXXXX XXX
	D-XXXXX	XXXXX	XXXXX	XXXXX XXX
	E-XXXXX	XXXXX	XXXXX	XXXXX XX
	F-XXXXX	XXXXX	XXXXX	XXX
	G-XXXXX	XXXXX	XXXX	
	H-			
	J-			
	K-			
	L-			
	M-			
N01 = Service information	-N-*XXXX	XXXXX	XXXXX	XXX *X XX*
	12345	67890	12345	67890 12345 678
		1	2	
				Index
N28 = Table of contents and publication information				

- 1 = Special features  
2 = Safety and precautionary measures  
3 = Testers and tools  
4 = Installation position of components

- a. Read from left to right.  
b. Title of micropicture (appears on each micropicture).

E16	Product/component/test step	
	Coordinate	
c. Limits of section		
Beginning	Mid-section	End
		One-page section
A01		

HOW TO USE THIS MICROCARD

Trouble-shooting instructions for  
System: EI - K  
Descriptions, photos, terminal designations and special features refer to the following vehicle:  
SAAB 900i - 16  
2,0 l/ 4 cyl. engine B202 i 09.85->  
SAAB 9000i - 16  
2,0 l/ 4 cyl. engine B202 i 12.85->  
These basic instructions represent detailed trouble-shooting instructions. They are not to be used as vehicle-specific instructions.  
Important!  
Descriptions and photos may differ from the vehicle-specific brief instructions.  
Binding set values, terminal assignments and special features are to be taken exclusively from the vehicle-specific brief instructions.  
For brief instructions refer to Contents Microcard KFZ-00..

A02		
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## SPECIAL FEATURES

- \* Control unit 0 227 400 104/022 with knock control and self-diagnosis for knock sensor and load signal.
- \* Trigger box 0 227 100 124 (with current limitation)
- \* Ignition coil 0 221 122 327
- \* Knock sensor 0 261 ...
- \* Flashing-code evaluation with evaluation unit KDAW 9980.

### Note:

The following vehicles feature a fault lamp in the instrument panel. (CHECK ENGINE)

Saab 900i as of model year 86

Saab 9000i as of model year 87

- \* In the case of vehicles with LH 2.2 Jetronic, the fault lamp may light up continuously with the engine running, thus indicating emergency operation of the LH-Jetronic.
- \* Ignition-pulse amplifier for actuating systems dependent on ignition pulses up to model year 87. As of model year 88, there is no ignition-pulse amplifier and the EI-K control unit term. 17 is connected directly to the LH-Jetronic control unit term. 1.

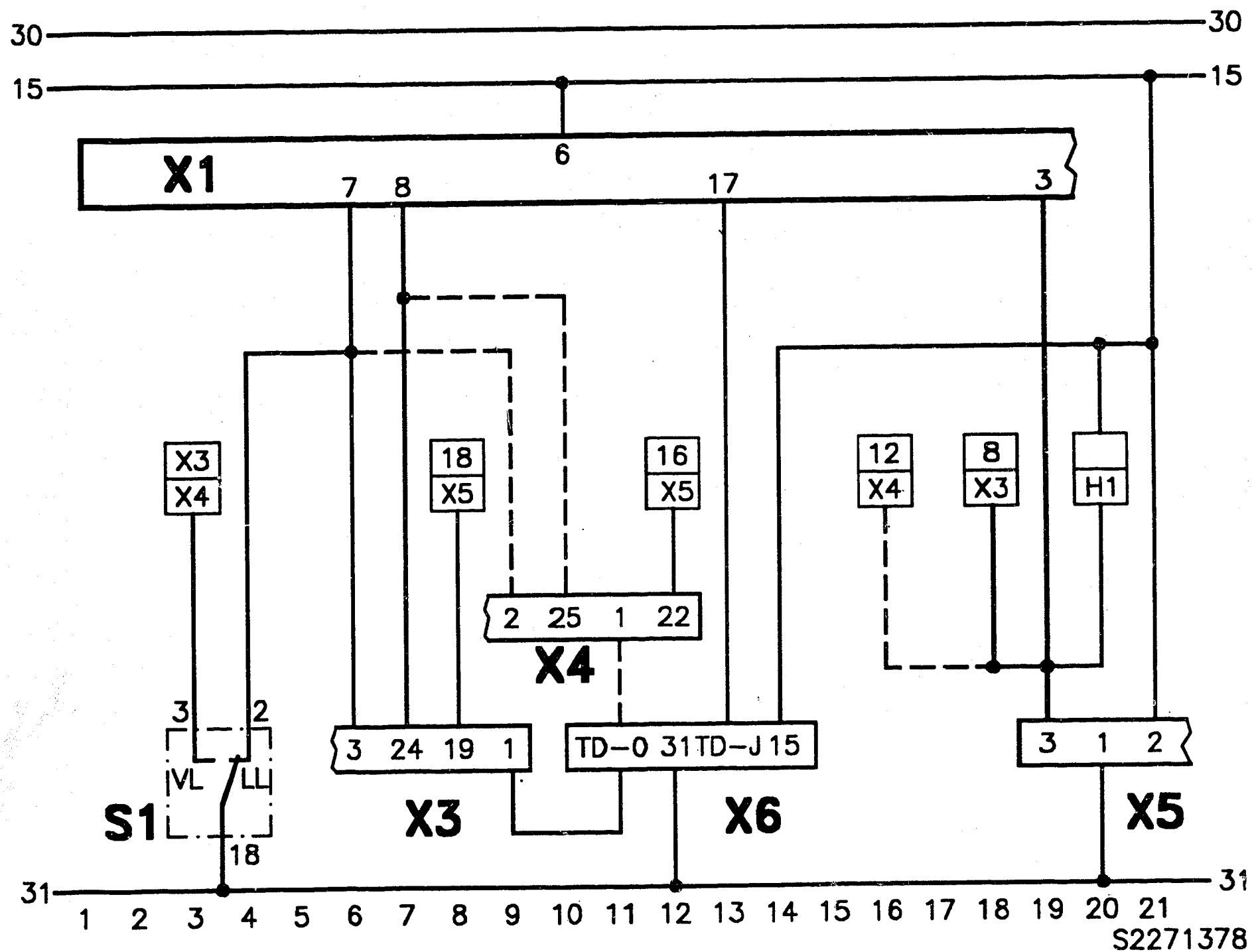
## SAFETY AND PRECAUTIONARY MEASURES

In this connection we should like to point out that VDE Regulations (in particular VDE 0104/7.67) and the pertinent local regulations are to be adhered to when performing work on or testing the ignition system.

### CAUTION!

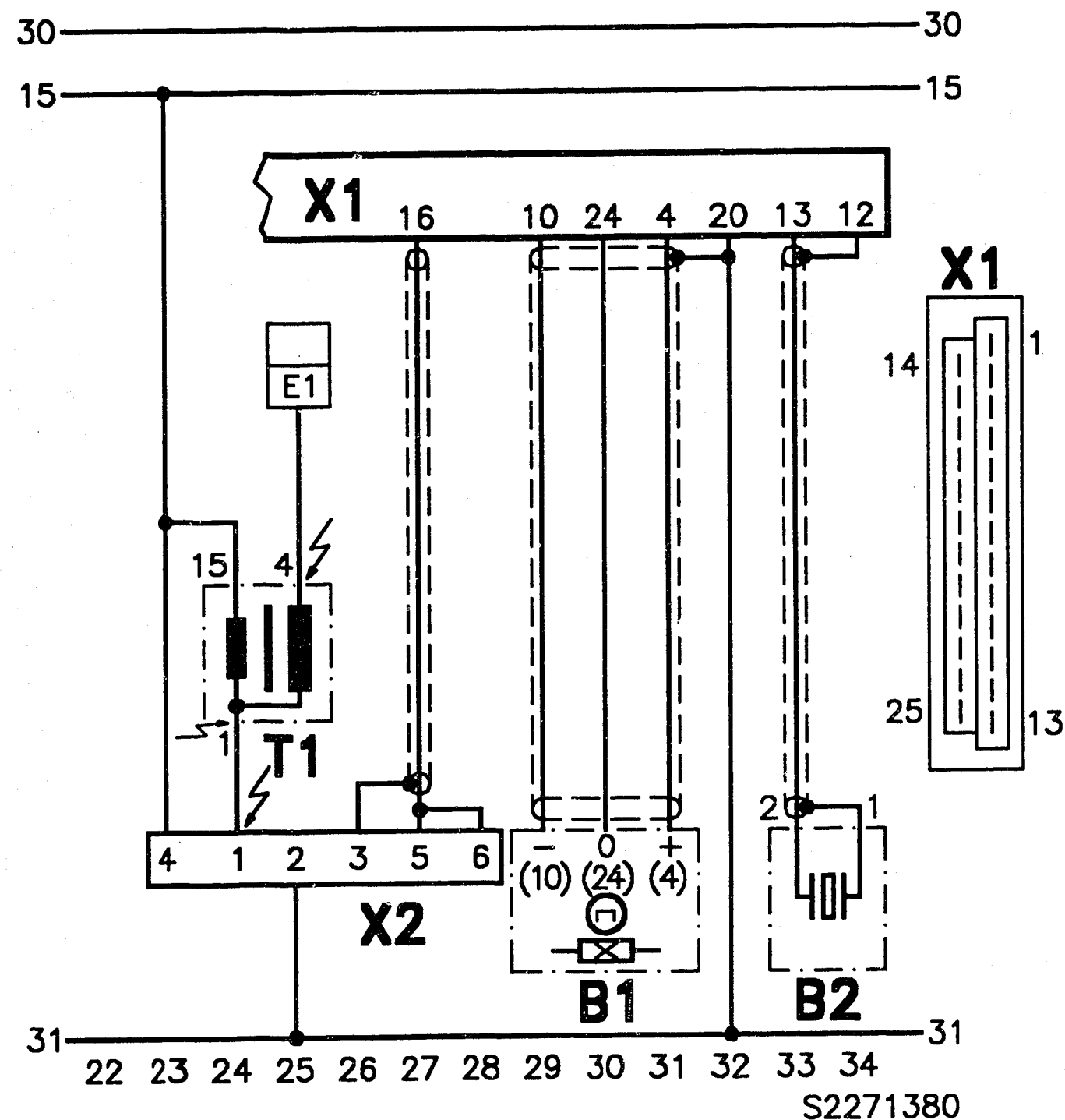
High-energy ignition system with dangerous high and low voltages!

Touching live parts or terminals may be highly dangerous (both on the primary and secondary sides).



# SAFETY AND PRECAUTIONARY MEASURES (CONTINUED)

Partial terminal diagram of electronic ignition system.



High-tension arrows: caution 400 V...25 kV

T1 = Ignition coil

X2 = Trigger-box plug

# SAFETY AND PRECAUTIONARY MEASURES (CONTINUED)

The hazardous locations are indicated with high-tension arrows taking the terminal diagram of an electronic ignition system as an example.



**SAFETY AND PRECAUTIONARY MEASURES  
(CONTINUED)**

Never start engine without battery securely connected (battery terminals tightened).  
Do not disconnect battery from vehicle electrical system with engine running.

Do not use a fast charger for starting the engine.  
Provide starting assistance only with second 12 V battery and jump leads.  
Caution! Owing to non-standardized requirements of vehicle manufacturers with regard to electronic products, we advise against using a 24 V battery for starting assistance.

When charging the battery in the vehicle or providing starting assistance, follow the operating instructions for the fast charger as well as instructions of the vehicle manufacturer.

Disconnect battery from vehicle electrical system before charging or fast-charging.

Incorrect polarity of the supply voltage, e.g. through incorrect connection of the battery or ignition coil, may lead to the destruction of a control unit.

Do not connect or disconnect wiring-harness plugs from control units or trigger boxes with the ignition on.

Remove control units at temperatures above + 80° C (paint-drying installation).

Remove control units before carrying out electric welding work.

**SAFETY AND PRECAUTIONARY MEASURES  
(CONTINUED)**

When testing compression, detach trigger-box plug or permanently connect ignition coil term. 4 to ground with auxiliary cable (hazardous high tension, insulation damage on ignition coil, ignition distributor, ignition harness).

Note:  
Auxiliary cable must feature at least 2 k  $\Omega$  interference suppression, e.g. sleeve-type suppressor (5 k  $\Omega$ )  
0 356 500 001.

Prescribed ignition coil (see part no.) is not to be replaced with a different ignition coil.

An interference-suppression capacitor is not to be connected to term. 1 of the ignition coil.

The positive terminal of the battery is never to be connected to term. 1 of the ignition coil as this will destroy the trigger box.

Do not short-circuit term. 1 of ignition coil to ground (e.g. to switch off engine), as this will destroy the ignition coil and possibly also the trigger box.

Ignition cable from ignition coil and ignition distributor term. 4 must not be detached during operation.

There must be no voltage flashover from term. 4 of the ignition coil to term. 1 and term. 15 of the ignition coil.

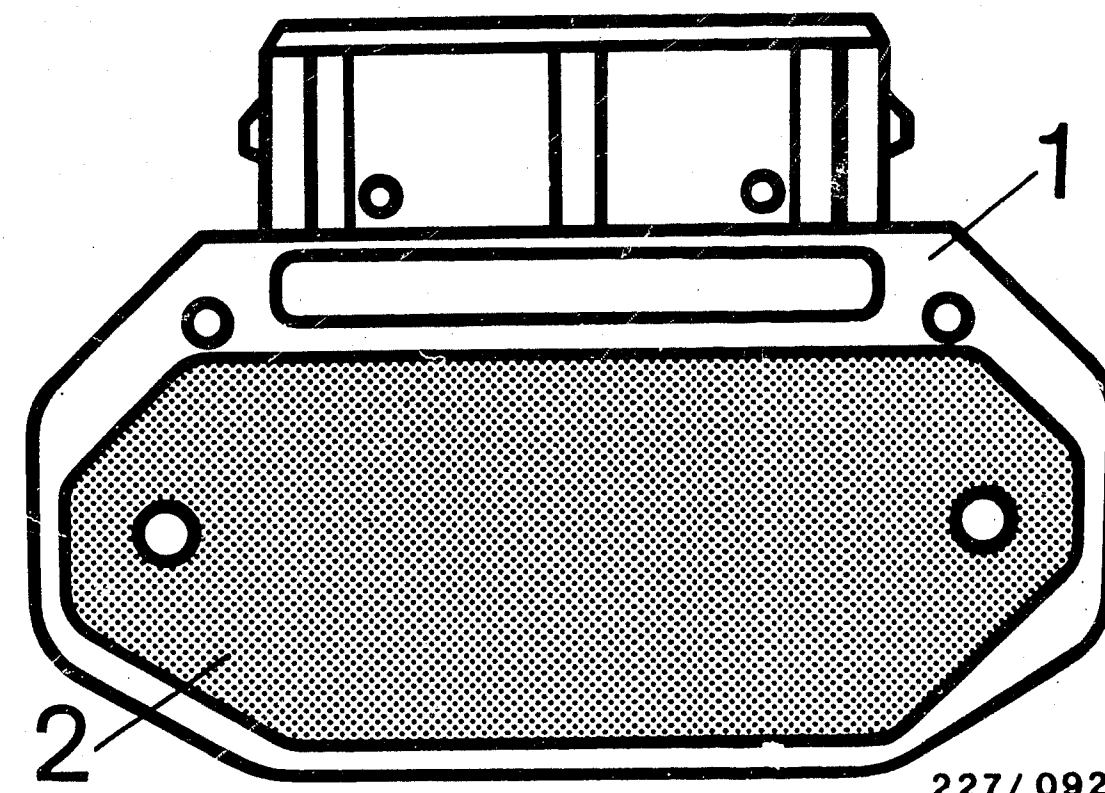
The secondary side of the ignition system must feature at least 2 k  $\Omega$  interference suppression, so as to prevent destruction of the trigger box. The original distributor rotor must be fitted with 1 k  $\Omega$ .

**SAFETY AND PRECAUTIONARY MEASURES  
(CONTINUED)**

Incorrect indication of engine speed, dwell angle and ignition point:

With this ignition system (trigger box with current limitation) there is a possibility of an incorrect indication of engine speed, dwell angle and ignition point on testers.

Refer to coordinates N10 for more detailed information



1 = Trigger box

2 = Base

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**SAFETY AND PRECAUTIONARY MEASURES  
(CONTINUED)**

The base must be coated with thermal conduction compound before installing the trigger box.

Only apply thermal conduction compound with a suitable implement (screwdriver, match etc.).  
Do not apply thermal conduction compound to painted parts.

# TESTERS AND TOOLS

Engine tester, e.g. Mot 206	0 684 000 206
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Pulse-shaping circuit (required for measurement of primary voltage with MOT 201, 206 and 400)	1 684 463 154
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Sleeve-type suppressor 5 k $\Omega$	0 356 500 001
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Ohmmeter ETE 014.00 or e.g. Pontavi Wh 2	0 684 101 400 comm. avail.
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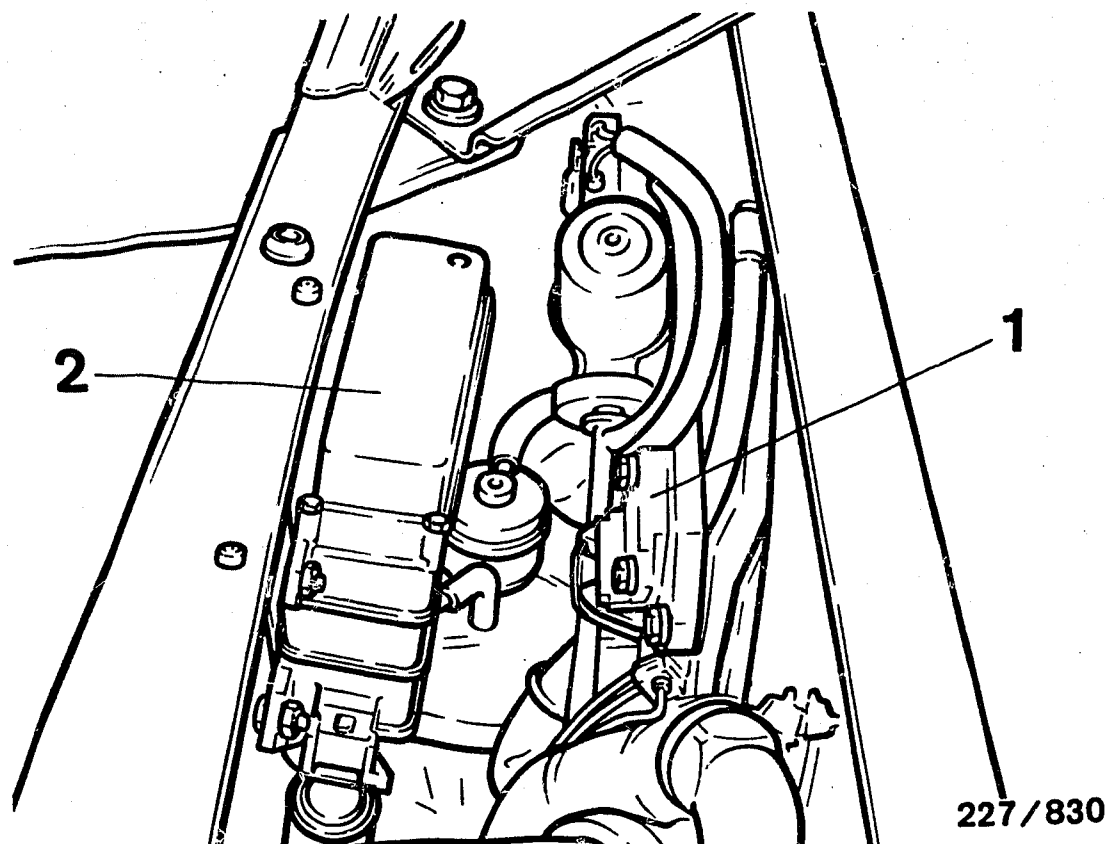
Voltmeter e.g. ETE 014.00	0 684 101 400
------------------------------	---------------

Test leads (for proper connection of testers to connectors)	KDZS 0004 KDZS 0005
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Test prod, black	1 684 485 034
Test prod, red (for proper connection of testers to connectors)	1 684 485 035

Thermal conduction compound	5 942 860 003
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For production reasons:  
continued on the following  
coordinate.

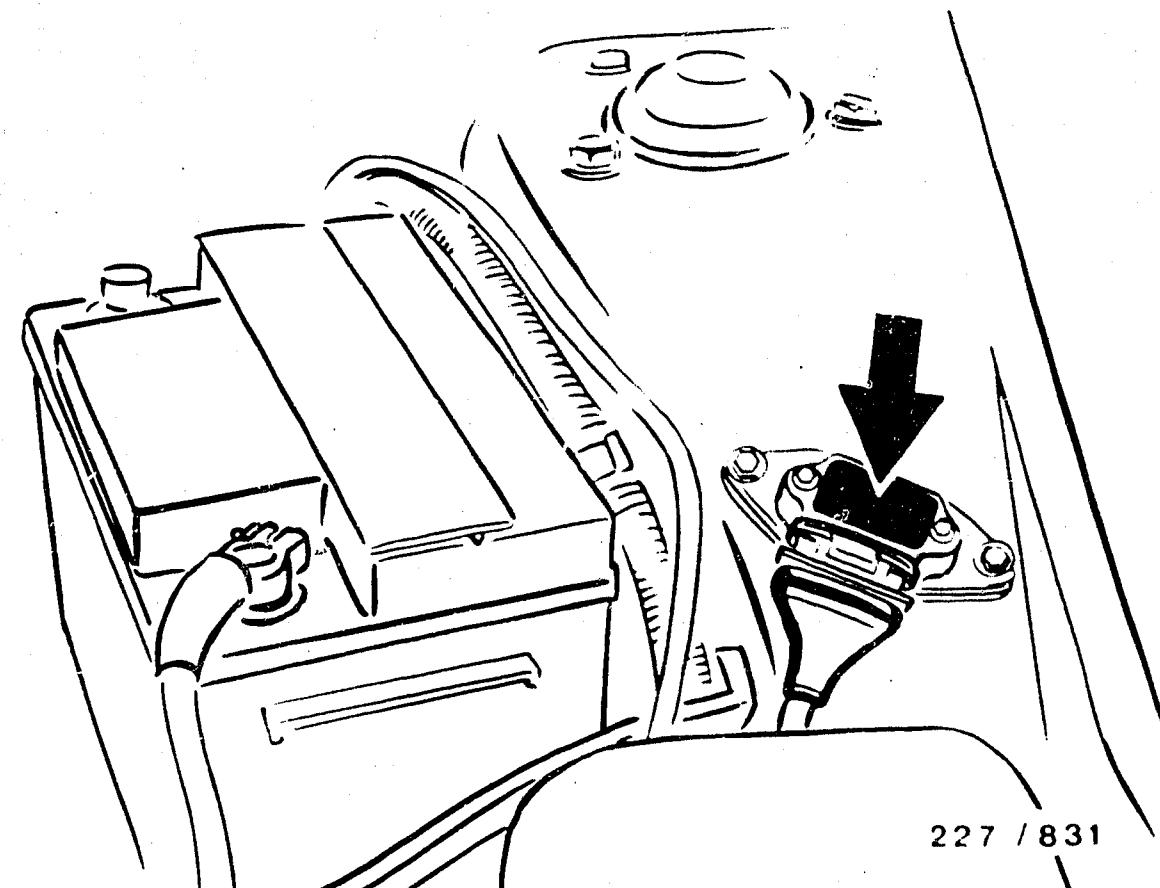


Saab 9001 16

1 = Trigger box  
2 = EI-K control unit

#### INSTALLATION POSITION OF COMPONENTS

Trigger box and EI-K control unit are located in the engine compartment (wheel house, left).

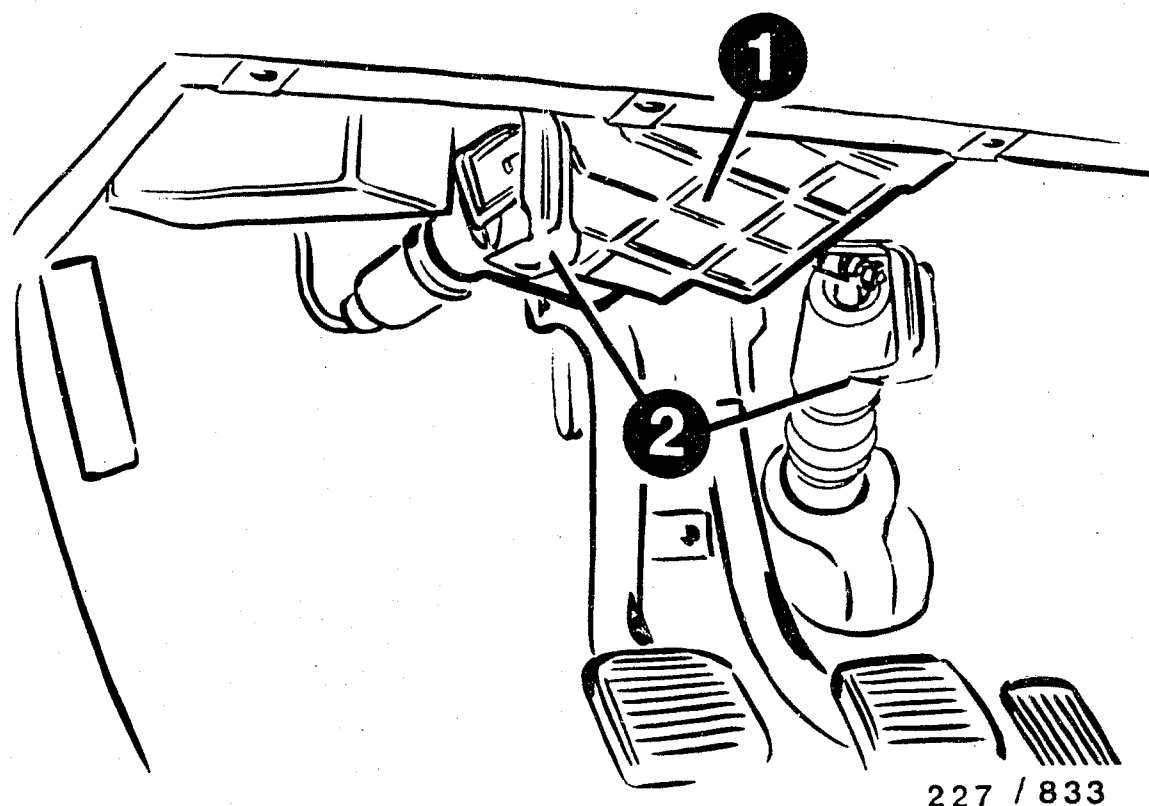


Saab 90001 16

Arrow = Trigger box

#### INSTALLATION POSITION OF COMPONENTS (CONTINUED)

The trigger box is located on a heat sink at the left-hand wheel box.

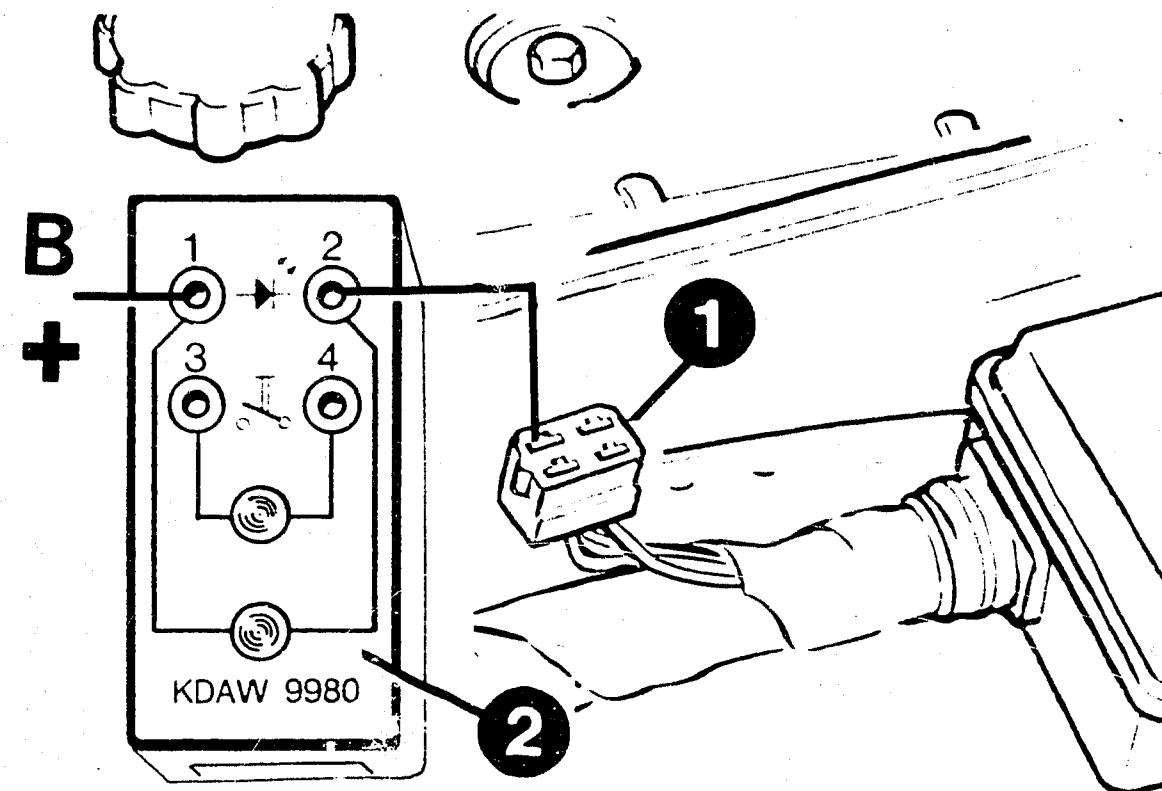


Saab 9000i 16

- 1 = EI-K control unit
- 2 = Bracket

#### INSTALLATION POSITION OF COMPONENTS (CONTINUED)

The EI-K control unit is located in the passenger compartment beneath the instrument panel.

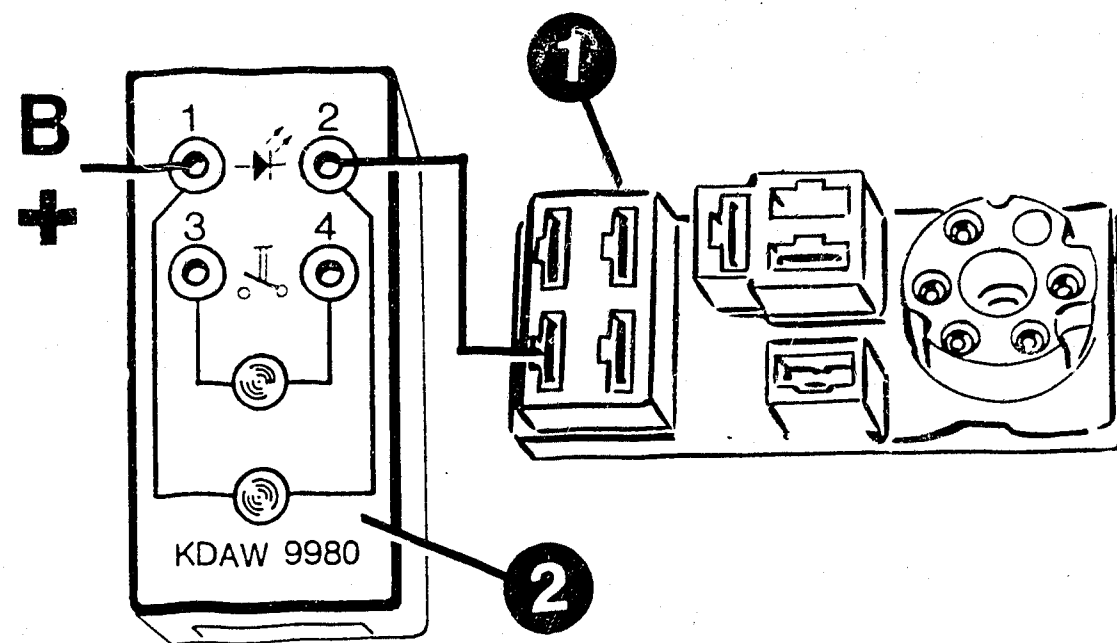


Saab 900i 16

- 1 = Diagnosis connection

#### INSTALLATION POSITION OF COMPONENTS (CONTINUED)

The diagnosis connection is located at the wiring harness on the central-electrics console.



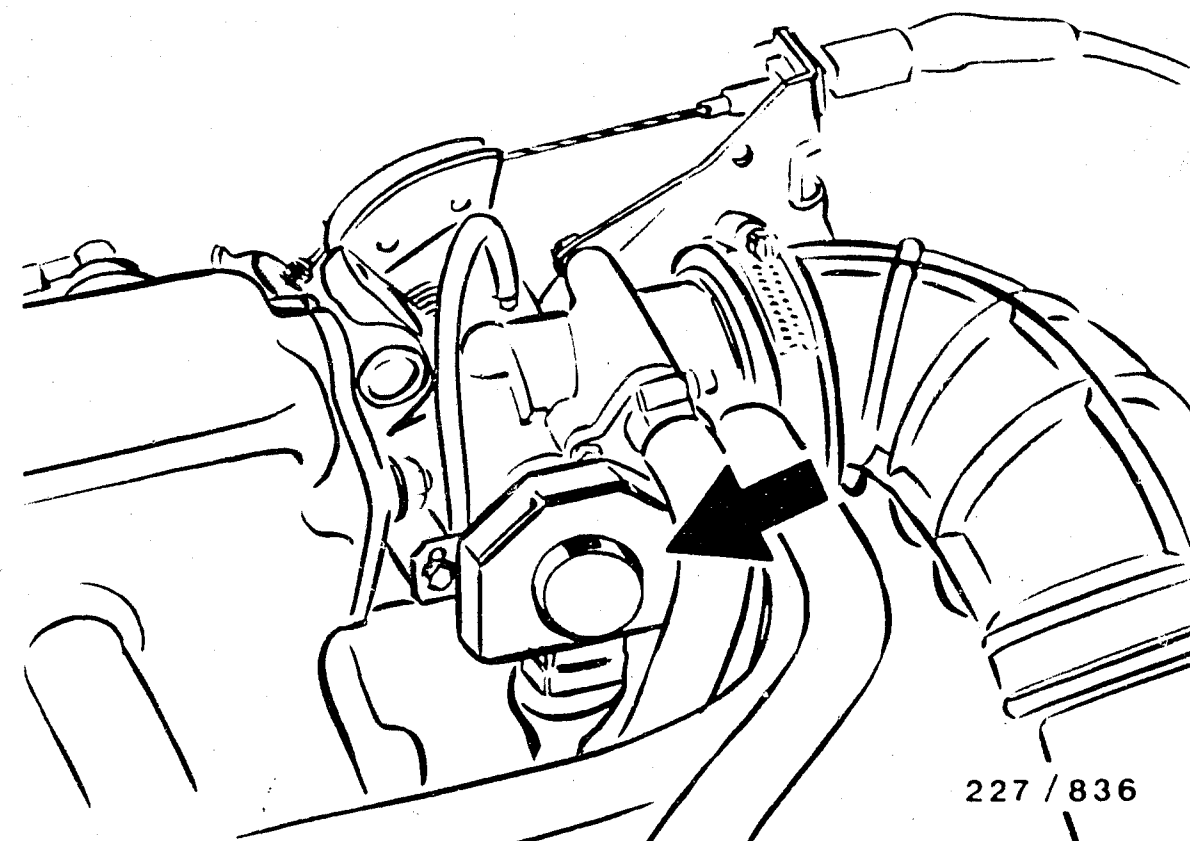
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Saab 9000i 16

1 = Diagnosis connection

#### INSTALLATION POSITION OF COMPONENTS (CONTINUED)

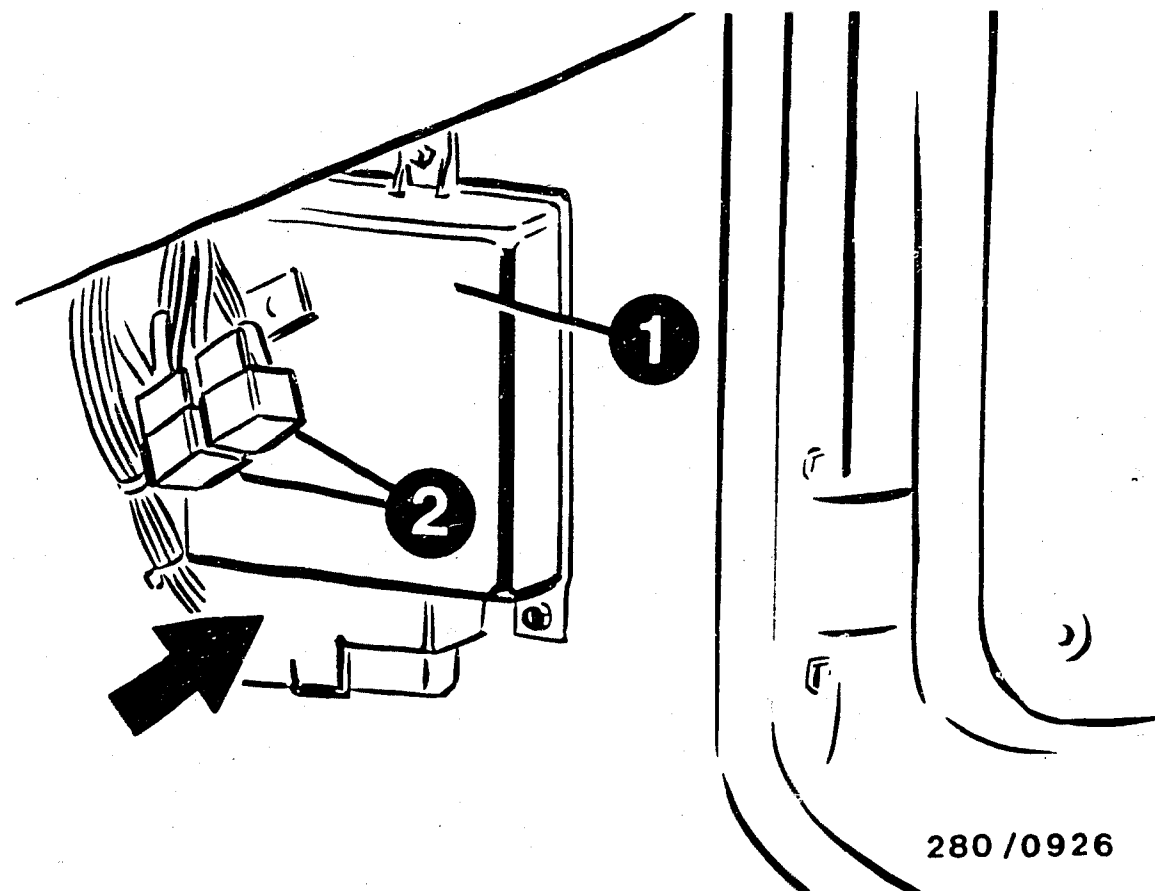
The diagnosis connection is located behind the engine bulkhead on the left-hand wheel box.



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Arrow = Throttle-valve switch

#### INSTALLATION POSITION OF COMPONENTS (CONTINUED)



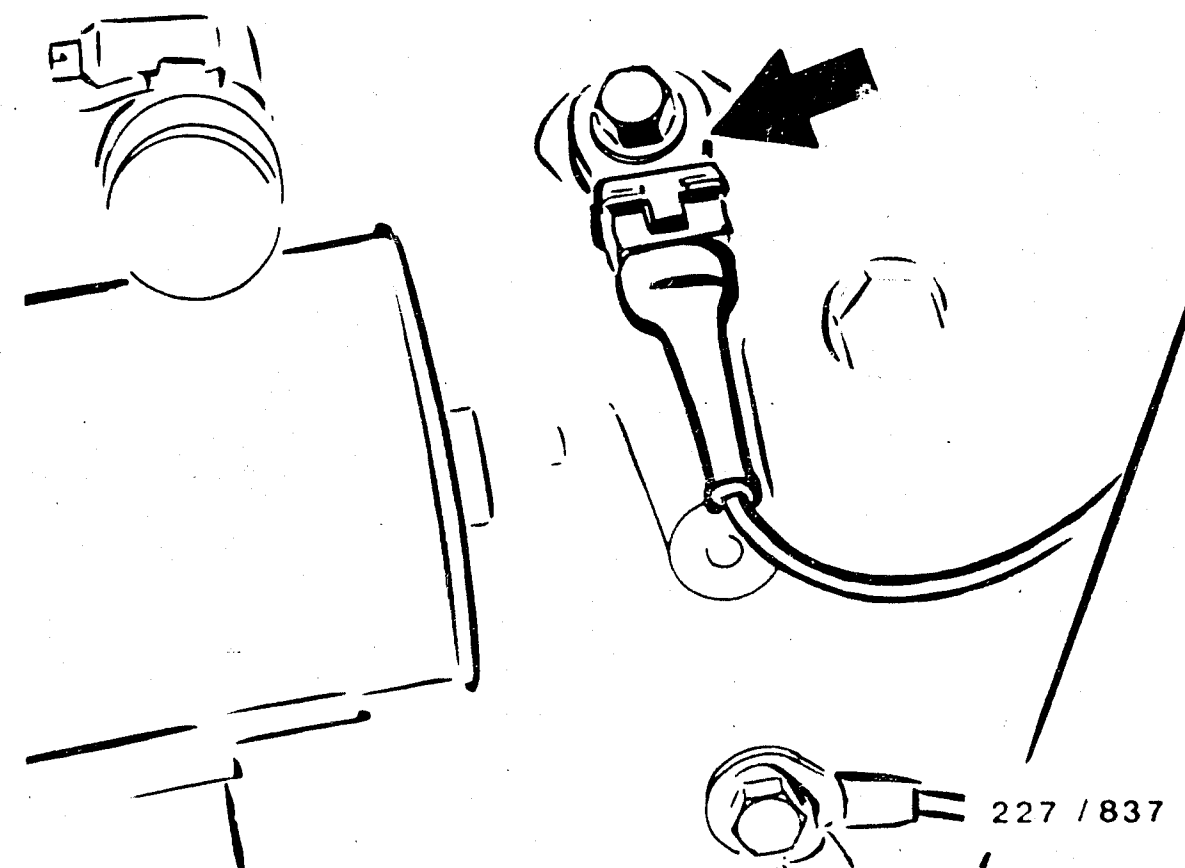
Saab 900i 16

1 = LH-Jetronic control unit  
2 = Main and pump relay

#### INSTALLATION POSITION OF COMPONENTS (CONTINUED)

The LH-Jetronic control unit is located in the passenger-side footwell, right, behind the side trim.

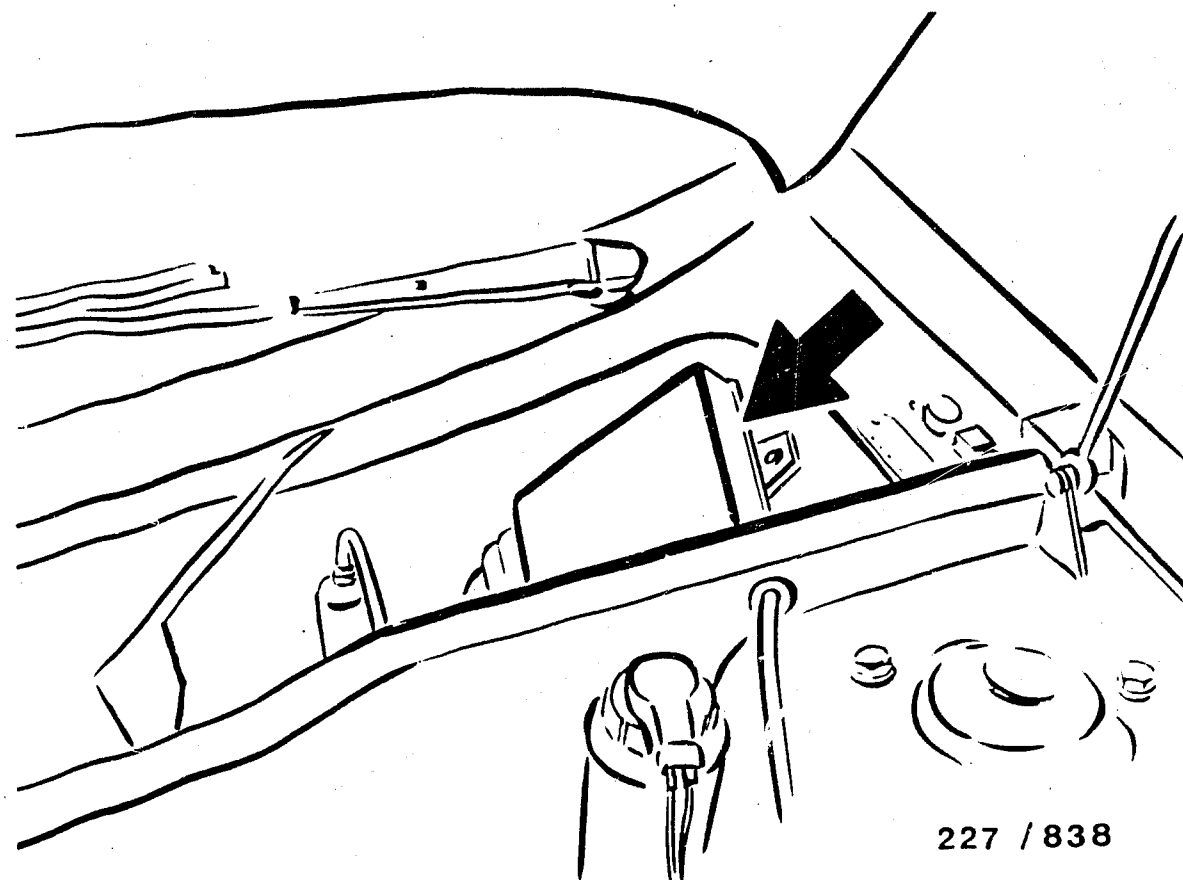
Zeilenanzahl \* -1 \* Unterschied!!



Arrow = Knock sensor

#### INSTALLATION POSITION OF COMPONENTS (CONTINUED)

The knock sensor is located at the engine block beneath the intake passages (2 and 3).



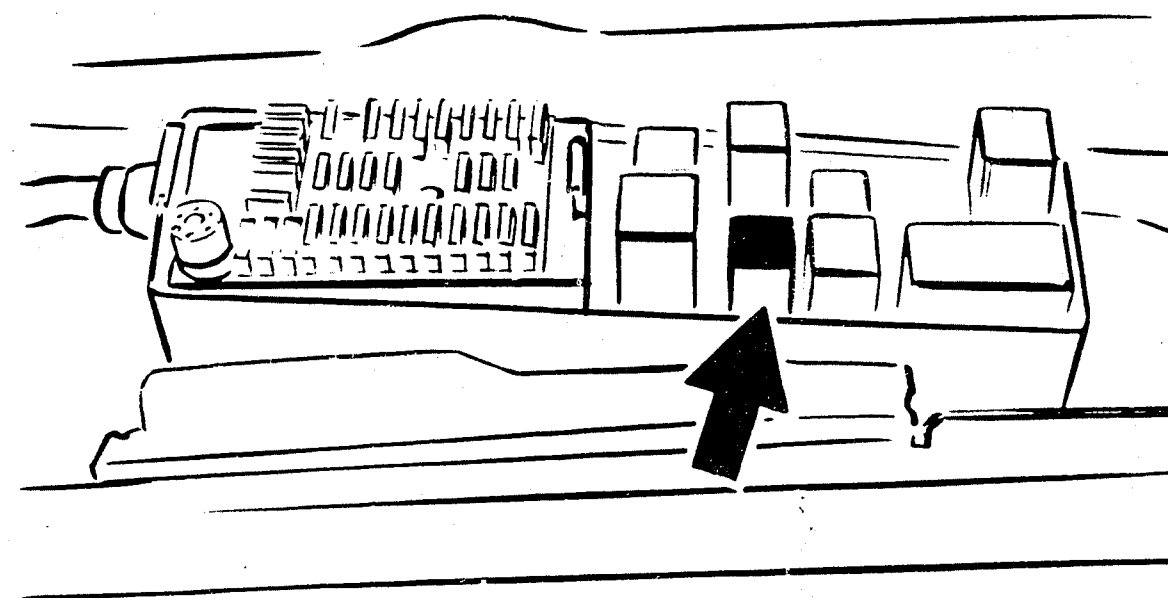
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Saab 9000i 16

Arrow = LH-Jetronic control unit

#### INSTALLATION POSITION OF COMPONENTS (CONTINUED)

The LH-Jetronic control unit is located behind the engine bulkhead. (Arrow)



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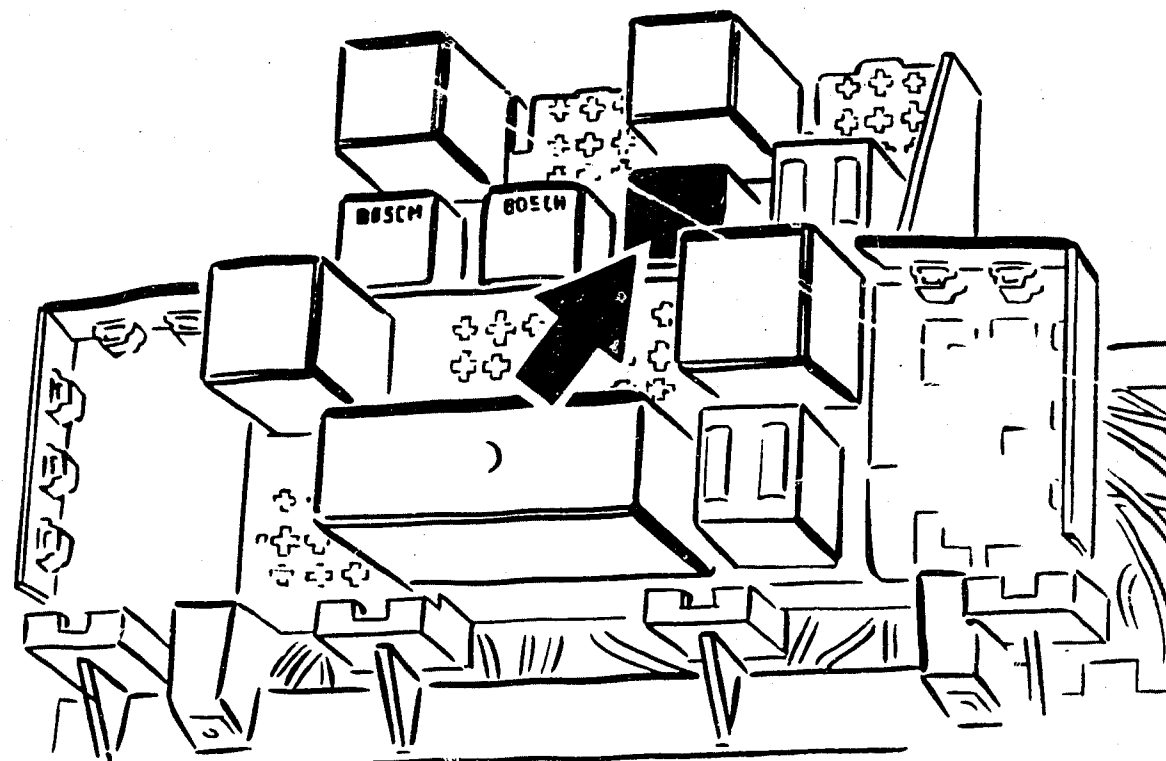
Saab 900i 16

Arrow = Ignition-pulse amplifier

#### INSTALLATION POSITION OF COMPONENTS (CONTINUED)

The ignition-pulse amplifier is fitted in the central-electrics console on the left-hand wheel box at relay position D. (Arrow)





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Saab 9000i 16

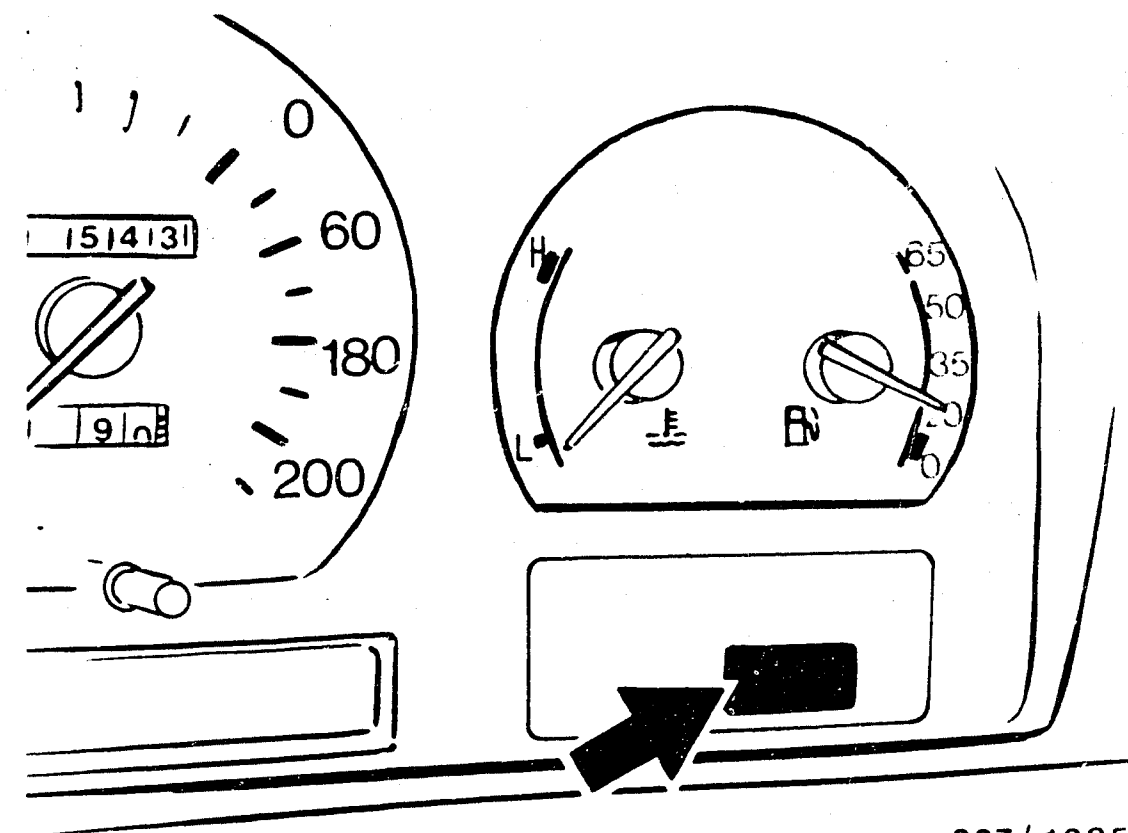
Arrow = Ignition-pulse amplifier

#### INSTALLATION POSITION OF COMPONENTS (CONTINUED)

The ignition-pulse amplifier is fitted in the central-electrics console behind the glove compartment at relay position J. (Arrow)

#### Removal instructions:

Remove glove compartment.  
Unscrew central-electrics console and lift out of swivel bearing.



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Saab 9000i 16

Arrow = Fault lamp in instrument panel  
(CHECK ENGINE)

#### INSTALLATION POSITION OF COMPONENTS (CONTINUED)

## HOW TO USE TROUBLE-SHOOTING CHART AND TROUBLE-SHOOTING PROGRAM

The TROUBLE-SHOOTING CHART starts with Coordinate B03 and contains customer complaint (fault symptom/fault characteristic feature) together with several possible causes in each case (component faults) and coordinate information for detailed trouble-shooting. If no coordinates are given, this is because the causes concerned do not require any test instructions.

In the event of a clearly established customer complaint, proceed consecutively and step by step as indicated in the trouble-shooting instructions in the stated sequence of possible causes.

Trouble-shooting should always be commenced with self-diagnosis (if provided) or with the universal test adapter (if possible). Only then should trouble-shooting be continued in line with the trouble-shooting chart.

In the event of a customer complaint which is not clear-cut, all causes indicated in the trouble-shooting chart must be tested. In order to avoid incorrect measurements, all causes are to be checked in the specified sequence (on account of the interdependence of test steps).

## HOW TO USE TROUBLE-SHOOTING CHART AND TROUBLE-SHOOTING PROGRAM (CONTINUED)

The TROUBLE-SHOOTING PROGRAM contains all system and component tests indicated in the trouble-shooting chart. It is sub-divided into three rows of boxes.

The left-hand column contains test instructions and set values.

The center column contains information on trouble-shooting and fault elimination.

The right-hand column contains pictures/connection diagrams linked to the text together with explanatory notes.

If the questions posed in the left-hand column can definitely be answered with "yes", trouble-shooting is to be continued with the next box below.

If the answer to the question is "no", the center column must be applied and the tests performed in the sequence indicated there.

Following fault elimination, repeat test as a check.

### TEST PREREQUISITES:

- Battery fully charged
- Engine in proper mechanical working order (e.g. compression, valve clearance etc.)
- Engine at operating temperature of approx. +80°C (if necessary)
- Proper connection of all connectors of wiring harness

**Customer complaint (fault symptoms)**

1. Starting motor operates, engine fails to start or starts only with difficulty.
2. Engine starts but then dies.
3. Idle problems (engine speed, exhaust gas).
4. Poor throttle take-up, flat spot during acceleration.
5. Engine missing (ignition, injection).
6. Maximum engine power/top speed not reached.
7. Fuel consumption too high.
8. Engine running on.
9. Engine pinging/knocking.
10. Engine overheating.
11. Fault lamp.

										Cause (component fault)	Coord.
									*	Self-diagnosis	B21
*	*	*	*	*	*					H.T. end	B23
*	*	*	*	*						Ignition coil	B25
*	*									Firing sequence	—
*										Ignition-distributor as-installed setting	B27
*										Voltage, EI-K control unit	C01
*										Voltage, trigger box	C01
*										Voltage, primary circuit	C03
*										Ignition-distributor plug and socket	C05
*										Magnetic-pulse-generator voltage supply	C07
*										Magnetic-pulse-generator function	C09
*										EI-K control unit function	C11
*										Engine-speed signal, LH-Jetronic	C13

**Customer complaint (fault symptoms)**

1. Starting motor operates, engine fails to start or starts only with difficulty.
2. Engine starts but then dies.
3. Idle problems (engine speed, exhaust gas).
4. Poor throttle take-up, flat spot during acceleration.
5. Engine missing (ignition, injection).
6. Maximum engine power/top speed not reached.
7. Fuel consumption too high.
8. Engine running on (dieseling).
9. Engine pinging/knocking.
10. Engine overheating.
11. Fault lamp.

										Cause (component fault)	Coord.
*										Contact resistances	C15
*										Primary signal	C19
							*			Fault lamp	C21
					*	*				Throttle-valve-switch idle contact	C23
	*	*		*	*	*	*			Ignition basic setting	C25
										Peak-coil-current cutoff	C27
			*							Voltage, trigger box (engine idling)	D01
			*							Voltage, ignition coil (engine idling)	D03
			*							Primary voltage Engine idling	D03

## USE OF SELF-DIAGNOSIS, SELF-DIAGNOSIS TEST TABLE, AND SELF-DIAGNOSIS TROUBLE-SHOOTING PROGRAM

The control unit installed in this vehicle incorporates self-diagnosis. For this reason, trouble-shooting must start with self-diagnosis.

Activation of self-diagnosis is described starting on Co-ordinate B09. The self-diagnosis test table starting on B11 includes:

- Fault indication (flashing code)
- Components or system functions inspected
- Test instructions/conditions
- Connection terminals
- Set-value information
- Co-ordinate information for trouble-shooting and elimination in the subsequent self-diagnosis trouble-shooting program.

## USING THE SELF-DIAGNOSIS, SELF-DIAGNOSIS TEST TABLE AND SELF-DIAGNOSIS TROUBLE-SHOOTING PROGRAM (Continued)

The self-diagnosis trouble-shooting program is divided into three columns starting at Coordinate B13.

The left-hand column contains test instructions and set values.

The center column contains information on trouble-shooting and on how to rectify the fault.

The right-hand column contains the illustrations/terminal diagrams belonging to the text, together with explanations.

If the questions in the left-hand column can be answered conclusively with "yes", continue trouble-shooting with the next box down.

If the answer to the question is "no", branch to the center column and carry out the tests in the order given there.

After rectifying a fault, repeat the test as a check.

If the self-diagnosis indicates a fault, but no system fault or component fault was found during trouble-shooting, try replacing the control unit.

If no more fault is indicated in self-diagnosis and the customer complaint has still not been eliminated (symptom of trouble), continue trouble-shooting with the trouble-shooting chart starting at Coordinate B03.

# HOW TO USE SELF-DIAGNOSIS, SELF-DIAGNOSIS TEST TABLE AND TROUBLE-SHOOTING PROGRAM (CONTINUED)

## Test prerequisite:

Fault lamp in instrument panel must light up with ignition "ON"; LED must light up if using KDAW 9980. Engine revs > 1000 min<sup>-1</sup>.

## Flashing-code evaluation:

The self-diagnosis is output in the form of a flashing code.

The flashing code consists of a flashing-pulse group with max. 5 flashing pulses. See top picture.

The flashing pulses are detected with the evaluation unit KDAW 9980 and evaluated (counted) by the person performing the test.

### Note:

Hatched field in picture signifies voltage pulse present (lamp lights up).

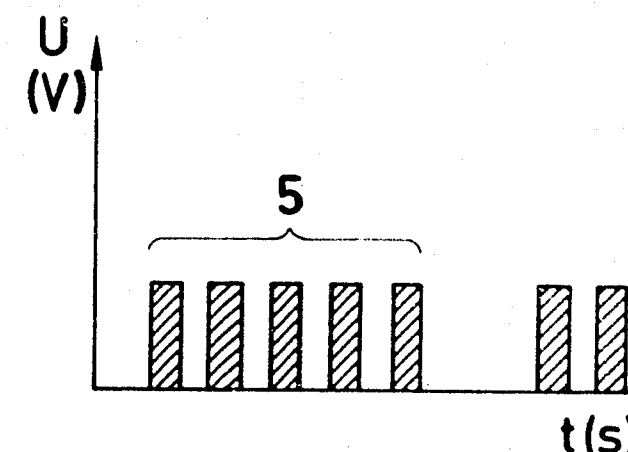
The flashing pulse and the subsequent pause both last approx. 0.5 s when idling (as a function of engine speed).

Transmission of the last flashing pulse is followed by a pause of approx. 2 seconds duration.

The flashing code 5 is presented in the top picture as an example.

Only 1 fault is ever indicated with this self-diagnosis. The first fault displayed must be eliminated in order to be able to call up further faults.

The EI-K control unit features a volatile memory. This means that the FAULT MEMORY is CLEARED with ignition OFF.



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### Note:

Cross-hatched area signifies fault lamp ON.

# HOW TO USE SELF-DIAGNOSIS, SELF-DIAGNOSIS TEST TABLE AND TROUBLE-SHOOTING PROGRAM (CONTINUED)

## ACTIVATION OF SELF-DIAGNOSIS

Connect evaluation unit KDAW 9980 with term. 1 to battery positive and with term. 2 to diagnosis connection.

See picture.

Ignition ON.

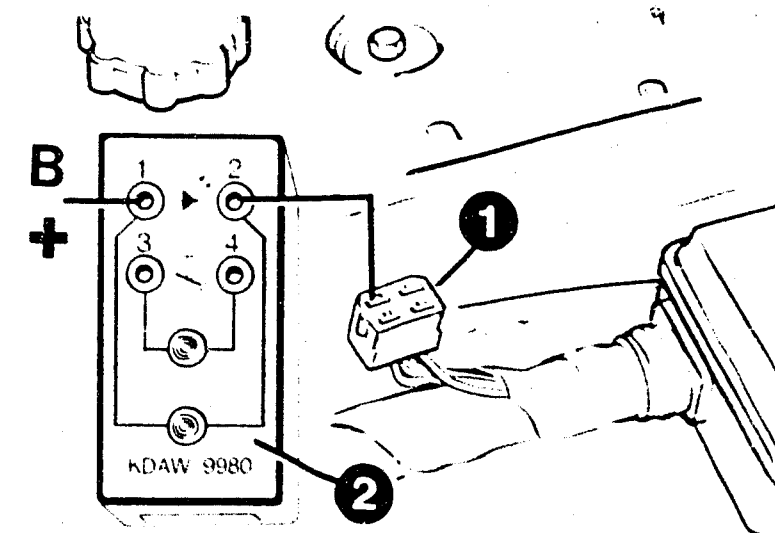
Fault lamp of evaluation unit KDAW 9980 must light up.  
Should fault lamp not light up, then perform test step,  
Coordinate C21.  
Subsequently continue activation.

Start engine and run briefly at  $> 1000 \text{ min}^{-1}$  to be followed by engine idling. (Idle contact closed)

Depending on the fault, the evaluation unit KDAW 9980 now indicates 4 or 5 flashing pulses which are evaluated with the aid of the self-diagnosis test table. The fault concerned must then be eliminated.

The flashing code is repeated until the ignition is switched off.  
This likewise clears the fault stored in the EI-K control unit.

Activation of self-diagnosis with subsequent fault elimination must be repeated until no further fault code is output by the EI-K control unit.

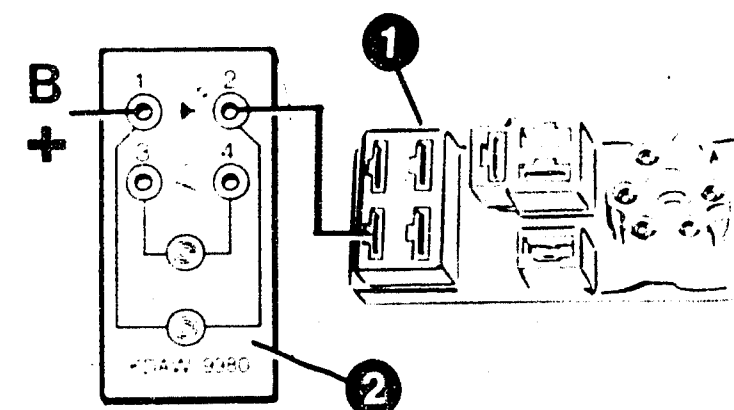


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1 = Diagnosis connection

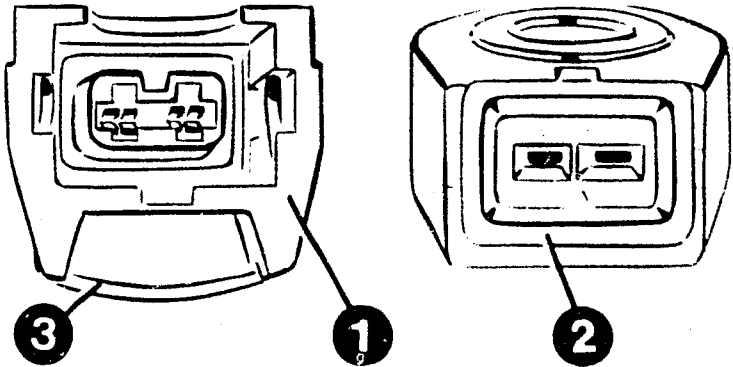
2 = Evaluation unit KDAW 9980

SAAB 9000i 16

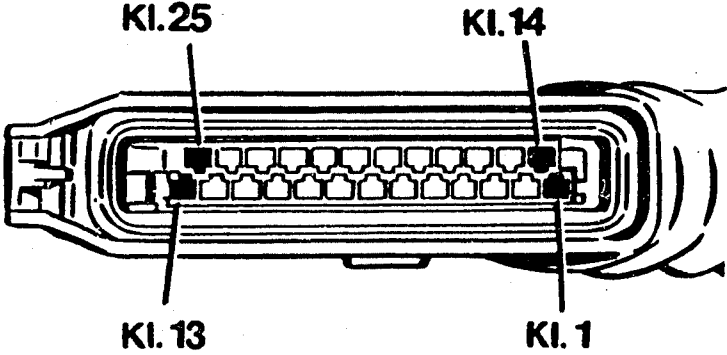


SELF-DIAGNOSIS TEST TABLE

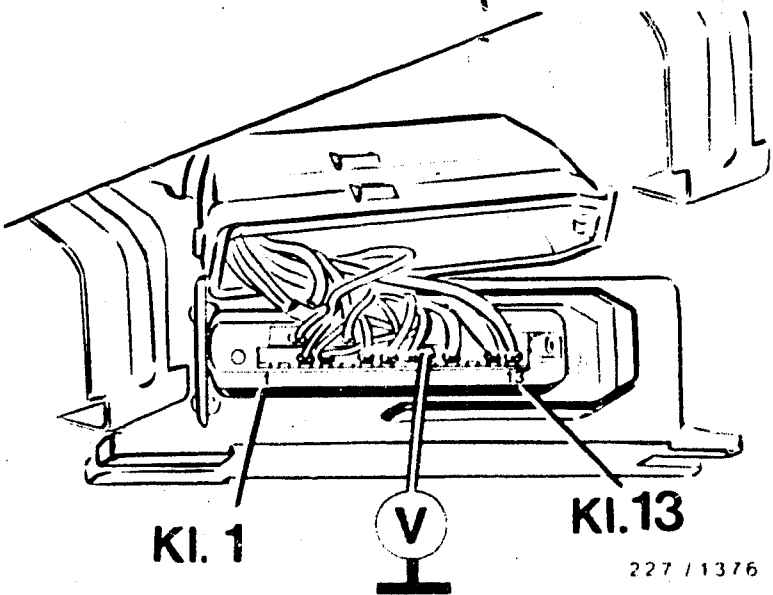
Fault indication Flashing code	Testing of component/function Test instructions/conditions	Termi- nals	Set values	Coor- dinate
4	<p><b>KNOCK SENSOR</b></p> <p>Detach knock-sensor plug.</p> <p>Visual inspection, knock-sensor plug connection (oxidation). See top picture.</p> <p>Resistance, knock-sensor plug connection and EI-K control-unit plug. See top and center picture.</p> <p>Resistance, EI-K control-unit plug. See center picture.</p> <p>Tightening torque Internal resistance</p> <p>If no fault is established, EI-K control unit may be the cause.</p>	<p>1 13 2 12</p> <p>13 20</p>	<p>approx. 0 <math>\Omega</math> approx. 0 <math>\Omega</math></p> <p>infinity <math>\Omega</math></p> <p>see brief instruc. see brief instruc.</p>	B13
5	<p><b>LOAD SIGNAL (LH-Jetronic)</b></p> <p>Voltage, EI-K control-unit plug with handle cover removed. See bottom picture. (Saab 9000i) Engine idling.</p> <p>Briefly depress accelerator pedal as far as it will go (sudden acceleration) Observe voltmeter.</p>	<p>8 20 (+) (-)</p>	<p>see brief instruc.</p> <p>Slight increase in voltage</p>	B19



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# SELF-DIAGNOSIS TROUBLE-SHOOTING PROGRAM ( 1 )

Flashing code  
Test knock sensor.

N>

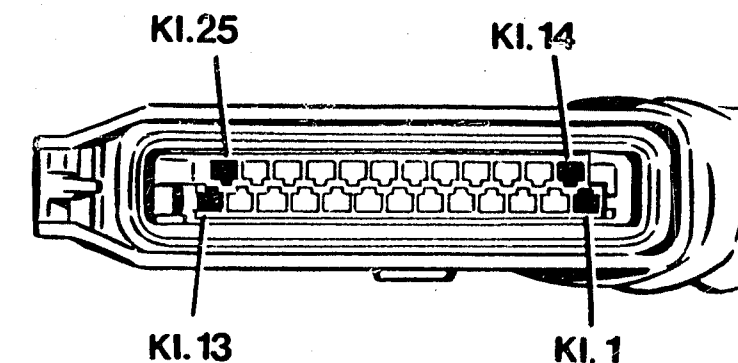
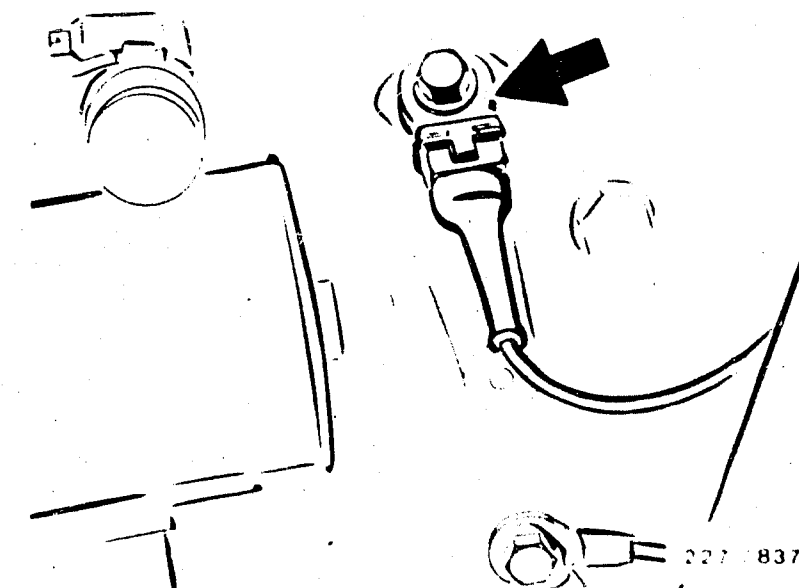
Eliminate open circuit.

Switch off ignition.  
Pull apart knock-sensor plug  
connection. See upper  
illustration, arrow.  
Disconnect EI-K control-unit plug.  
See center illustration.  
Connect ohmmeter to:

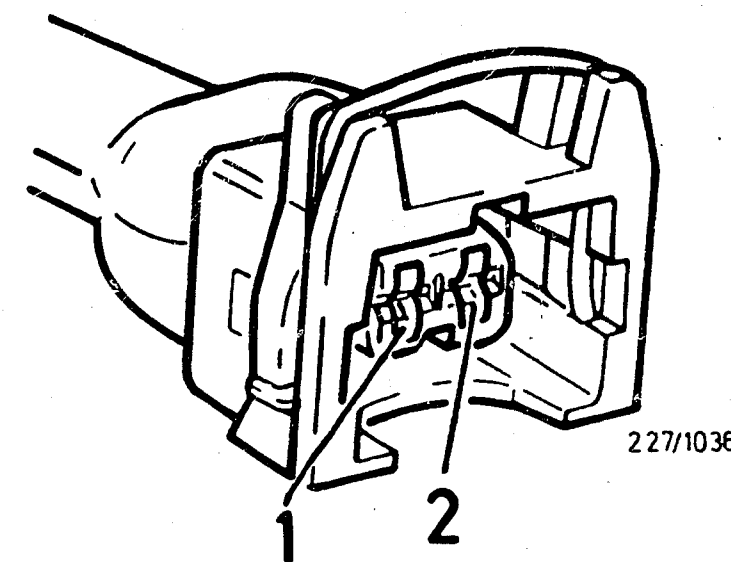
EI-K control-	Knock-sensor
unit plug	plug connection
(center	(lower
illustration)	illustration)
Term. 13 and term. 2	
Term. 12 and term. 1	

Set value: approx. 0  $\Omega$   
(continuity)

Is set value obtained?



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Continued on next picture page



SELF-DIAGNOSIS TROUBLE-SHOOTING PROGRAM (1 ) CONTINUED ( 1 )

Connect ohmmeter to knock-sensor  
plug connection term. 1 and  
term. 2.  
See upper illustration.  
Set value: infinity  $\Omega$   
(open circuit).

N>

If ohmmeter indicates approx.  
 $0 \Omega$  (continuity), eliminate short-  
circuit between leads from EI-K  
control-unit plug to knock-sensor  
plug connection.

Is set value obtained?

Y

Connect knock-sensor  
plug.

N>

Replace knock sensor.

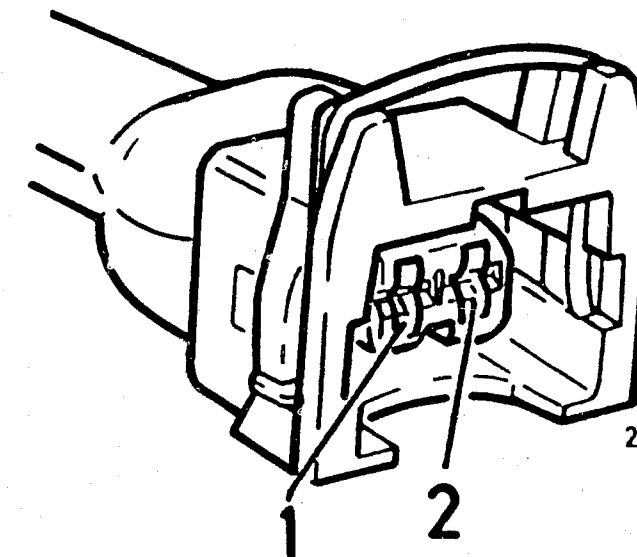
Connect ohmmeter to EI-K control-  
unit plug term.12 and term.13.

Set value: see brief instructions.

Is set value obtained?

Y

Continued on next picture page



SELF-DIAGNOSIS TROUBLE-SHOOTING PROGRAM (1 ) CONTINUED ( 2 )

Check tightening torque of knock-sensor fastening screw.  
See picture, arrow.  
Set value: see brief instructions

N>

Tighten to specified tightening torque.

Is set value obtained?

Y

Replace knock sensor.  
Activate self-diagnosis.  
"Old" knock sensor is defective,  
if fault lamp now no longer  
indicates flash code 2142.

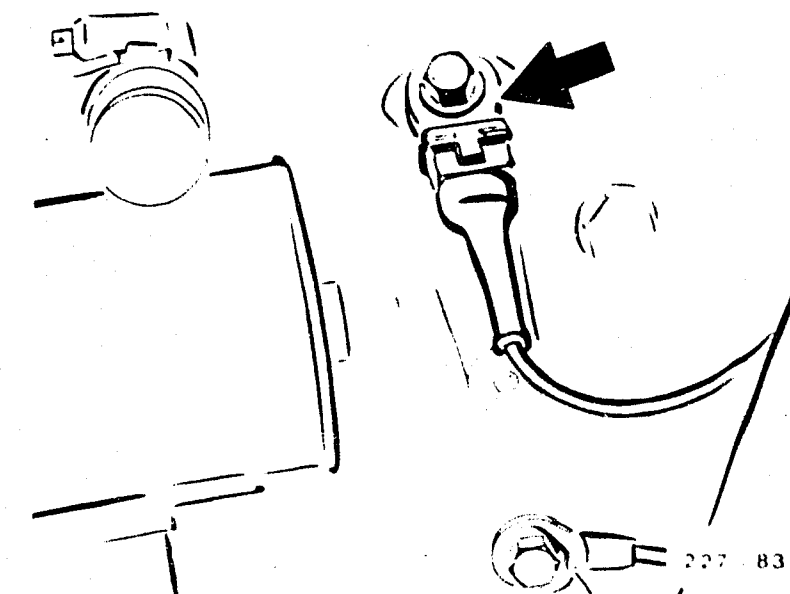
N>

Re-install "old" knock sensor  
and replace EI-K control  
unit.

Self-diagnosis O.K.?

Y

Return to self-diagnosis  
test table B11



# SELF-DIAGNOSIS TROUBLE-SHOOTING PROGRAM ( 2 )

Flashing code 5

Test load signal.

Switch off ignition.

Pull off EI-K control-unit plug and push back handle cover after unscrewing the fastening screws and removing the rubber seal.

Connect EI-K control-unit plug. See upper illustration.

Connect voltmeter to EI-K control-unit plug term. 8 (+) and to vehicle ground.

Run engine at idle.

Read off and note down voltage value.

Briefly apply full throttle and observe voltage.

The previously indicated voltage must change slightly.

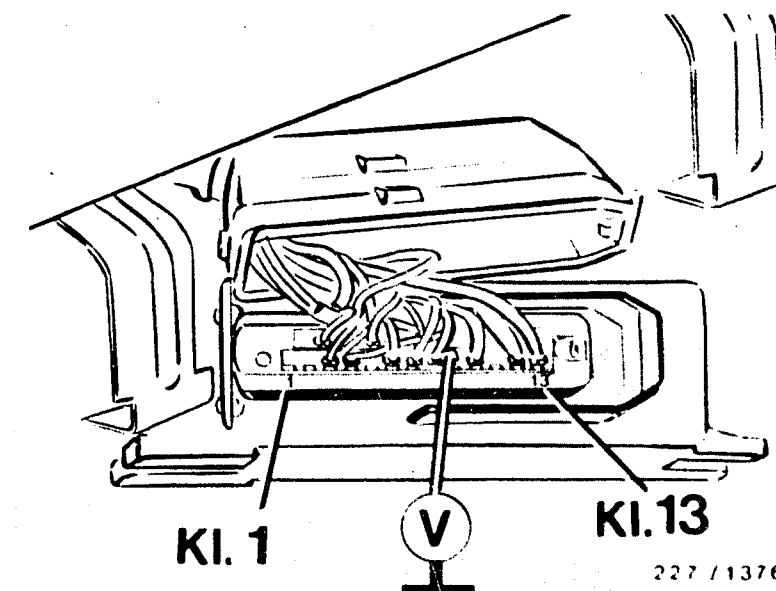
Has the voltage changed?

N>

Switch off ignition.

Detach EI-K and Jetronic control-unit plug. Check lead from EI-K control-unit plug term. 8 to LH-Jetronic control-unit plug term. 24 for open-circuit, short to positive and short to ground. Eliminate fault.

Renew LH-Jetronic control unit if there was no fault present.



227 / 1376

Return to trouble-shooting chart B03

# TROUBLE-SHOOTING PROGRAM ( 1 )

Check self-diagnosis connection.

1. Connect analog voltmeter to battery positive and diagnosis connection.  
See top picture.  
Switch on ignition, voltmeter must indicate approximate battery voltage.

2. Start engine and run it briefly at > 1000 min. <sup>-1</sup> .  
Voltmeter must now indicate approx. 0 V or may show voltage pulses.

Voltage O.K. in items 1 and 2?

N>

1. If no battery voltage was indicated in item 1, detach EI-K control-unit plug and check lead from EI-K control-unit plug term. 3 to diagnosis connection for open-circuit.  
See bottom picture.

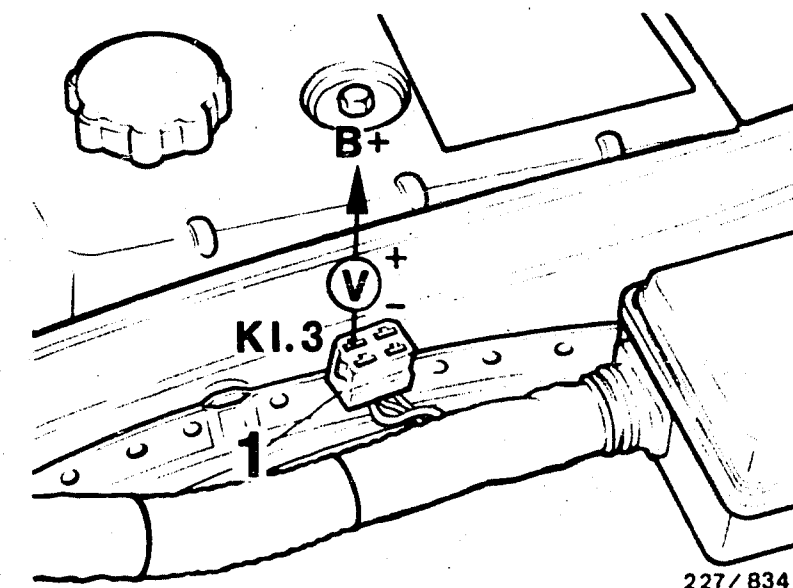
Eliminate open-circuit.

Renew EI-K control unit if there was no open-circuit.

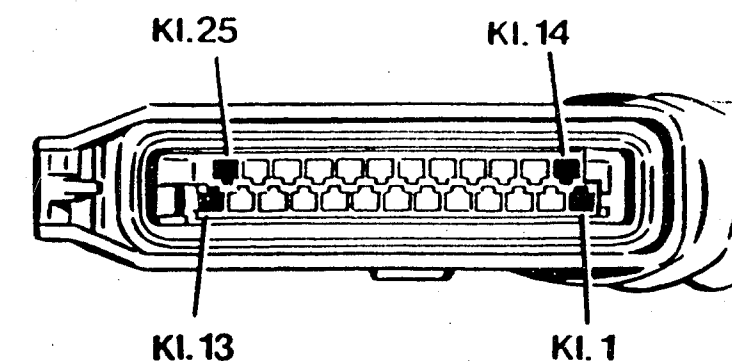
2. If battery voltage was constantly indicated in item 2, check lead from EI-K control-unit plug term. 3 to diagnosis connection for short to ground.

Eliminate short to ground.

Renew EI-K control unit if there was no short to ground.



1 = Diagnosis connection  
e.g. Scab 900 1



Return to trouble-shooting chart  
B03

227 / 321

## TROUBLE-SHOOTING PROGRAM ( 2 )

↓

Test high-voltage side.

N>

Repair high-voltage side.

Test spark plugs, spark-plug connectors, suppression resistors, H.T. ignition cables, distributor cap, distributor rotor etc. for proper operation (e.g. open circuit, shunt).

Assessment e.g. through ignition oscillogram, resistance measurements and visual check.

High-voltage side O.K.?

↓

Return to trouble-shooting chart  
B03

# TROUBLE-SHOOTING PROGRAM ( 3 )

Check ignition coil

Visual examination:

Remove protective cap from ignition coil and check whether plug is in position and whether sealing compound has escaped.  
See picture.

Electrical check:

Ignition coil primary term. 15 and term. 1

(Take resistance of test lead and test prods into account)

Set value: see brief instructions

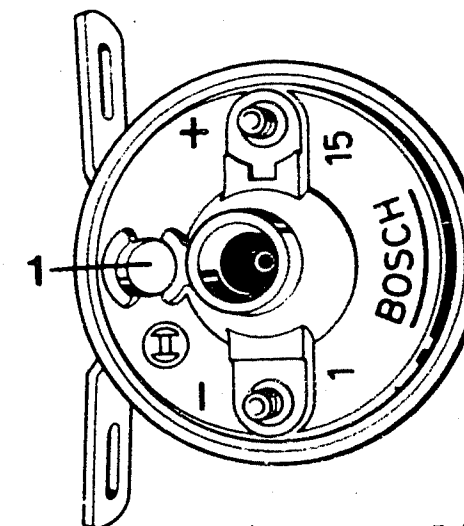
Ignition coil secondary term. 1 and term. 4

Set value: see brief instructions

Visual examination O.K./set value obtained?

N>

1. If plug is not in position and/or sealing compound has escaped, replace trigger box and EI-K control unit and ignition coil.
2. If set values are incorrect, replace ignition coil.



227/0059

1 = Plug

Return to trouble-shooting chart  
B03

# TROUBLE-SHOOTING PROGRAM ( 4 )

Check ignition-distributor as-installed setting.

Set crankshaft, cylinder 1 to mark, flywheel 0° = TDC. See top picture.

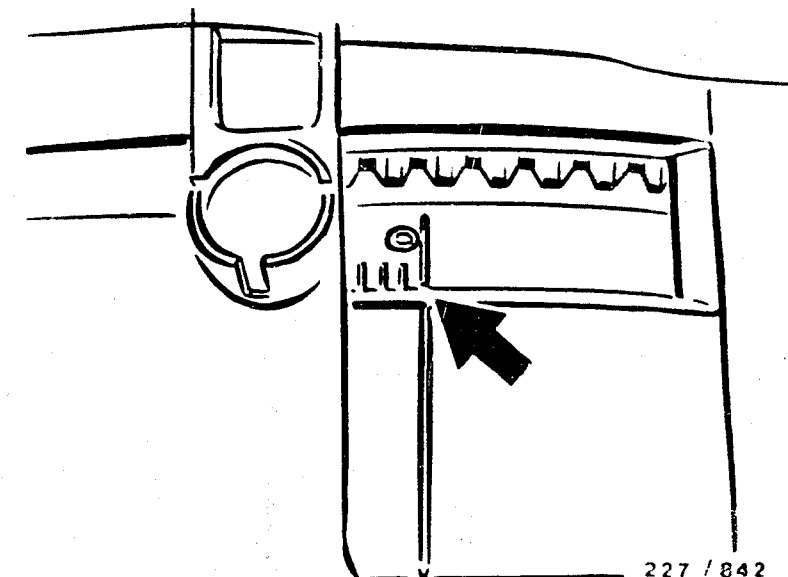
Remove distributor cap from ignition distributor.

Push back dust-protection cover.

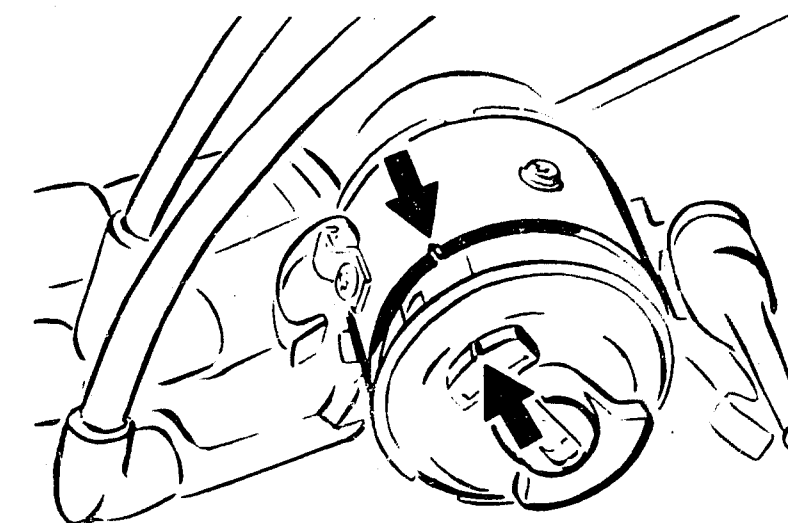
The distributor rotor must be positioned such that the center of the distributor-rotor electrode faces the housing mark, cylinder 1. See bottom picture. (Arrow)

Ignition-distributor as-installed setting O.K.?

Adjust ignition distributor.



Arrow = TDC mark



Return to trouble-shooting chart B03

# TROUBLE-SHOOTING PROGRAM ( 5 )

Test voltage supply of  
EZ-K control unit.

Switch off ignition.

Disconnect EI-K control-unit  
plug and connect voltmeter  
to term. 6 (+) and term. 20 (-).  
See illustration.

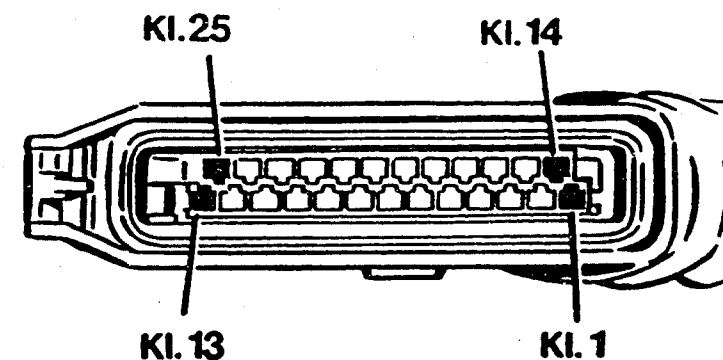
Switch on ignition.

Set value: battery voltage

Is set value obtained?

Check lead from ignition/starting  
switch to EI-K control-unit plug  
term. 6 including ground lead  
term. 20 for open-circuit.

Eliminate open-circuit.



227 / 321

Check voltage, trigger box.

Detach trigger-box plug and  
connect voltmeter to term. 4 (+)  
and term. 2 (-).  
See bottom picture.

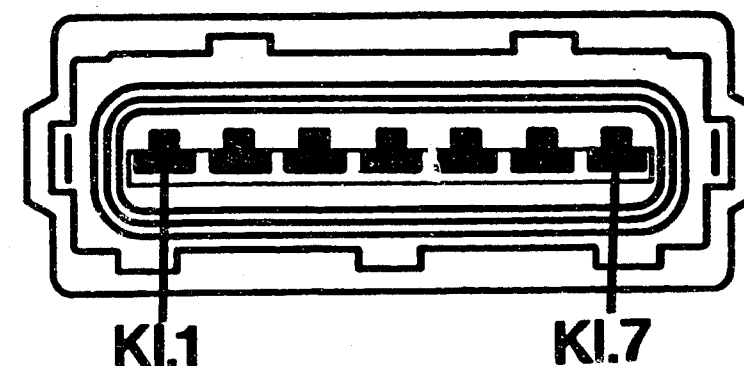
Switch on ignition.

Set value: battery voltage

Is set value attained?

Check leads and connections of  
ignition and starting switch to  
trigger-box plug term.4,  
including ground cable term.2,  
for open circuit.

Eliminate open circuit.



227/320/1

Return to trouble-shooting chart  
B03

C01

<==>

C02

<==>



# TROUBLE-SHOOTING PROGRAM ( 6 )

Check voltage, primary circuit.

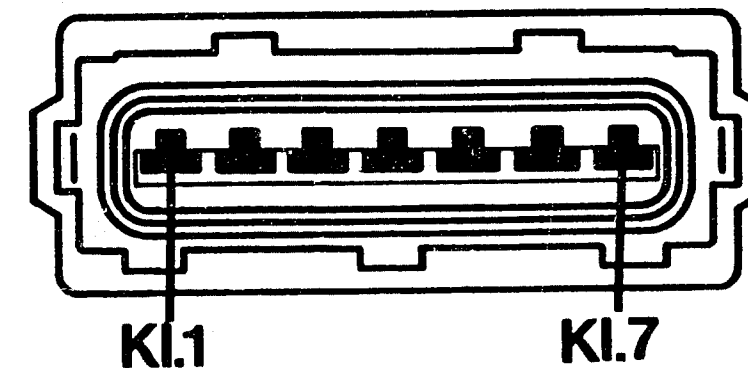
Detach trigger-box plug and connect  
voltmeter to term. 1 (+) and term.  
2 (-).  
See top picture.  
Switch on ignition.

Set value: battery voltage

Is set value attained?

N>

Test for open-circuit in lead from  
ignition and starting switch to  
ignition coil term. 15, primary  
winding of ignition coil and lead  
from ignition coil term. 1 to  
trigger-box plug term. 1 including  
ground lead term. 2.  
Eliminate open-circuit.



227/320/1

Return to trouble-shooting chart  
B03

C03

<=>

C04

<=>

TRUBLE-SHOOTING PROGRAM ( 7 )

V

Check ignition-distributor plug  
and socket.

N>

Eliminate oxidation.

Detach ignition-distributor plug.

Visual inspection:  
Check contacts of ignition-  
distributor plug and socket for  
oxidation.

Contacts O.K.?

Y

V

Return to trouble-shooting chart  
B03

C05

<==>

C06

<==>

# TROUBLE-SHOOTING PROGRAM ( 8 )

Test voltage supply of magnetic pulse generator.

Ignition-distributor and EI-K control-unit plugs are connected.

Push back rubber sleeve of ignition-distributor plug.

Connect voltmeter to ignition-distributor plug term. 4 (+) and term. 10 (-).

Switch on ignition.

Set value equal to/greater than 10 V

Is set value obtained?

N>

Ignition OFF  
Detach ignition-distributor plug.

Connect voltmeter to ignition-distributor plug term.4 (+) and term.10 (-).

Ignition ON.  
If voltage is less than 10 V, check lead from ignition-distributor plug term.4 to EI-K control unit plug term.4 for short to ground.

Renew EI-K control unit if there was no short to ground.

Renew magnetic pulse generator if voltage is equal to/greater than 10 V.

If voltage is 0 V, then connect ohmmeter consecutively to:

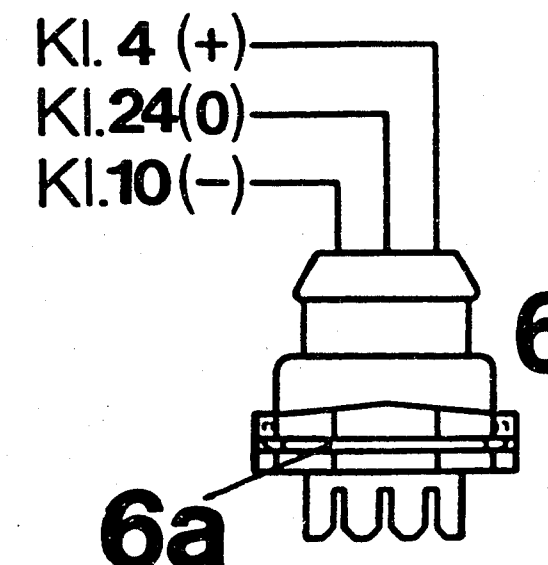
Ignition-	EI-K control
distributor	unit
plug	plug

Term. 4	and	term. 4
Term.10	and	term.10

Set value: approx. 0  $\Omega$  in each case (continuity).

Eliminate open circuit.

Renew EI-K control unit if there was no open circuit.



227 / 617

6 = Ignition-distributor plug  
6a = Wire catch

Return to trouble-shooting chart B03

# TROUBLE-SHOOTING PROGRAM ( 9 )

Test operation of magnetic pulse generator.

Ignition-distributor and EI-K-control-unit plugs are connected.

Push back rubber sleeve of ignition-distributor plug.

Connect oscilloscope in program-switch position "Special" in accordance with operating instructions.

For example, MOT 201:

Red terminal with test prod to ignition-distributor plug term. 24 (measuring signal).

Black terminal to vehicle ground.

Start engine.

Oscilloscope must indicate rectangular pulse. See illus.

Rectangular pulse present?

N>

Ignition OFF.

Detach ignition-distributor plug and EI-K control unit plug.

1.  
Check lead from ignition-distributor plug term.24 to EI-K control unit plug term.24 for open circuit, short to ground or short to positive.

Eliminate fault.

Attach EI-K control unit plug.

2.  
Connect voltmeter to ignition-distributor plug term.24 (+) and vehicle ground (-).

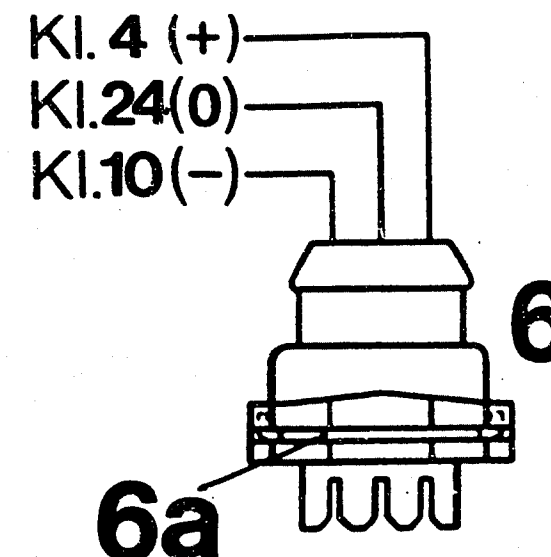
**N o t e :**  
Use voltmeter with internal resistance (Ri) greater than 50 k  $\Omega$  /V (otherwise incorrect measurement).

Ignition ON.

Set value: equal to/greater than 2 V.

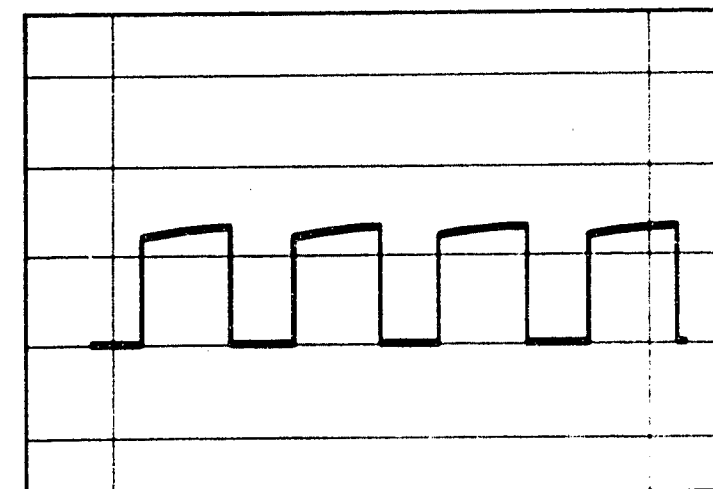
Renew EI-K control unit if set value was not attained.

Renew magnetic pulse generator/ignition distributor if items 1 and 2 were O.K.



2271617

6 = Ignition-distributor plug  
6a = Wire catch



22710096

Return to trouble-shooting chart B03

# TROUBLE-SHOOTING PROGRAM (10)



Check EI-K control unit function.

Ignition-distributor and EI-K control unit plug are attached.

Detach trigger-box plug.

Connect oscilloscope in program-selector-switch setting "Special" in accordance with operating instructions.

For example MOT 206:

Red terminal to trigger-box plug term. 5 or term. 6 (measurement signal)  
See top picture.

Black terminal to vehicle ground.

Start engine.

Oscilloscope must indicate rectangular pulse.  
See bottom picture.

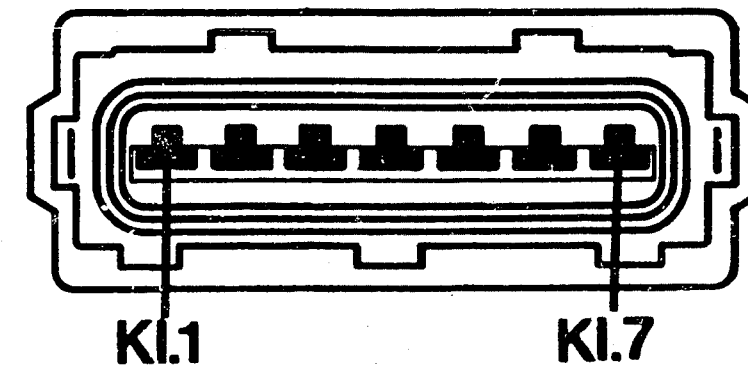
Rectangular pulse present?

N>

Check lead from EI-K control unit plug term.16 to trigger-box plug term.5 or 6 for open circuit, short to ground or short to positive.

Eliminate fault.

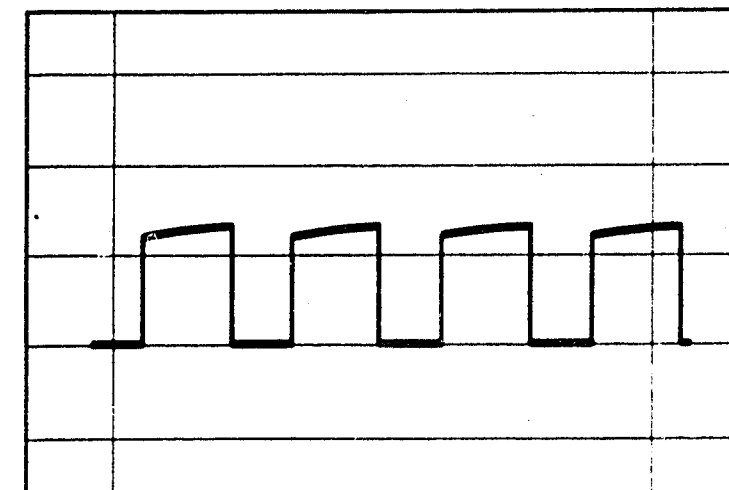
Renew EI-K control unit if there was no fault present.



227/320/1



Return to trouble-shooting chart B03



22710096

# TROUBLE-SHOOTING PROGRAM (11)

Check engine-speed signal,  
LH-Jetronic.  
Ignition OFF.  
Detach LH-Jetronic control-unit  
plug.  
Connect oscilloscope in program-  
switch setting "Special" with  
red clip to LH-Jetronic control-  
unit plug term. 1 and  
with black clip to vehicle ground.

Start engine.

Oscilloscope must indicate  
rectangular pulse.  
Rectangular pulse present?

N>

Detach EI-K control-unit plug.  
Check lead from EI-K control-unit  
plug term. 17 to LH-Jetronic  
control-unit plug term. 1  
for open-circuit, short to  
positive and short to ground.

In the case of vehicles with  
ignition-pulse amplifier, check  
voltage supply and function of  
ignition-pulse amplifier.  
Eliminate any faults.

If there is no fault present,  
detach handle cover from EI-K  
control-unit plug and attach  
control-unit plug again.  
Connect oscilloscope in program-  
switch setting "Special" with red  
clip to EI-K control-unit plug  
term. 17 and with black clip to  
vehicle ground.

Start engine.

Renew EI-K control unit if no  
rectangular pulse present.

Return to trouble-shooting chart  
B03

# TROUBLE-SHOOTING PROGRAM (12)

Test contact resistance (primary side).

Detach negative and positive lead of battery.

Detach trigger-box plug.  
See picture.

Switch on ignition.

Test for contact resistance in leads from battery positive terminal to trigger-box plug term. 4 including leads from battery negative terminal to trigger-box plug term. 2.

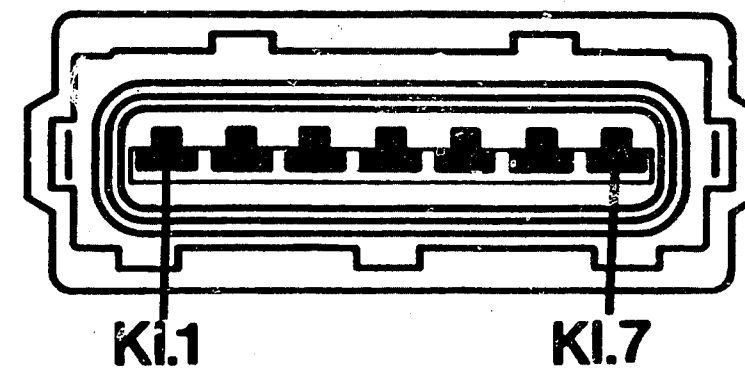
(Take account of resistance of test leads/test prods.)

Set value: see brief instructions

Is set value attained?

N>

Eliminate contact resistance.



227/320/1

Continued on next picture page

TRUBLE-SHOOTING PROGRAM (12) CONTINUED ( 1)

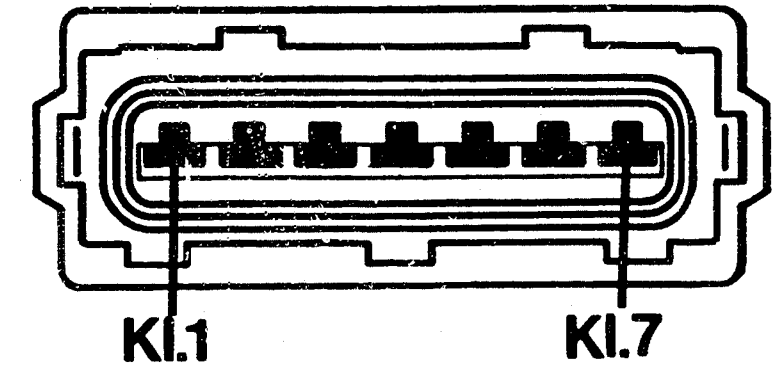
Test for contact resistance in leads from positive battery terminal to ignition coil term. 15 as well as in lead from ignition coil term. 1 to trigger-box plug term. 1.  
See picture.  
(Take account of resistance of test lead/test prods).

Set value: see brief instructions

Is set value attained?

N>

Eliminate contact resistance.



227/320/1

Return to trouble-shooting chart  
B04



# TROUBLE-SHOOTING PROGRAM (13)

V

Test primary signal

EI-K control-unit plug, trigger-box plug and ignition-distributor plug are connected.

Remove protective cap of ignition coil.

Primary signal with oscilloscope

Connect oscilloscope to ignition coil in accordance with operating instructions.

Start engine. Oscilloscope must indicate a primary voltage (level irrelevant).

O R

primary signal with engine-speed tester.

Connect engine-speed tester to ignition coil in accordance with operating instructions.

Start engine.

Engine-speed tester must indicate a value (level irrelevant).

Primary signal present?

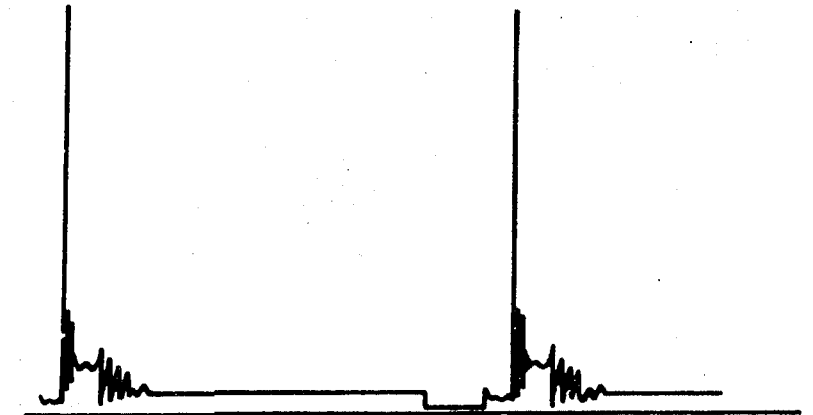
Y

V

Return to trouble-shooting chart B04

N>

Renew trigger box.



227/1100

TROUBLE-SHOOTING PROGRAM (14)

Check fault lamp.  
(CHECK ENGINE)

Switch on ignition.

Does fault lamp light up?

N>

Switch off ignition.

Detach EI-K control-unit plug.

Connect term. 3 of EI-K  
control-unit plug with test lead  
to ground.

Switch on ignition.

Fault lamp must light up.

If fault lamp does not light up,  
check voltage supply, leads and  
fault lamp.

Return to trouble-shooting chart  
B04

C21



C22



# TROUBLE-SHOOTING PROGRAM (15)

Check throttle-valve-switch idle contact.  
Ignition off.  
Detach EI-K control-unit plug and connect ohmmeter to term. 7 and vehicle ground.  
See top picture.

Throttle valve is closed.  
Ohmmeter must indicate approx. 0  $\Omega$ .

Open throttle valve approx. 2°.  
Ohmmeter must indicate infinity  $\Omega$ .  
(LH-Jetronic control-unit plug detached).

Resistance O.K.?

N>

Detach plug of throttle-valve switch.  
See bottom picture.  
Consecutively connect ohmmeter to:

Throttle-valve-switch plug

EI-K control-unit plug

Term. 2 and term. 7  
Term. 18 and vehicle ground

Ohmmeter must indicate approx. 0  $\Omega$ .

Eliminate open-circuit if resistance is infinity  $\Omega$ .

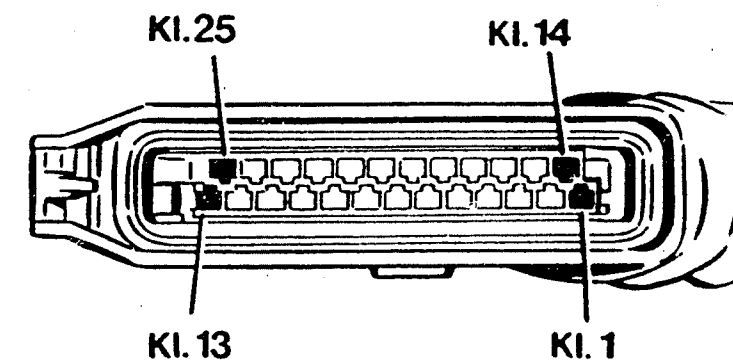
Connect ohmmeter to throttle-valve switch term. 2 and term. 18.

Resistance with closed throttle valve approx. 0  $\Omega$ .  
If set value is not attained, adjust throttle-valve switch.  
If set value is still not attained after adjustment, renew throttle-valve switch.

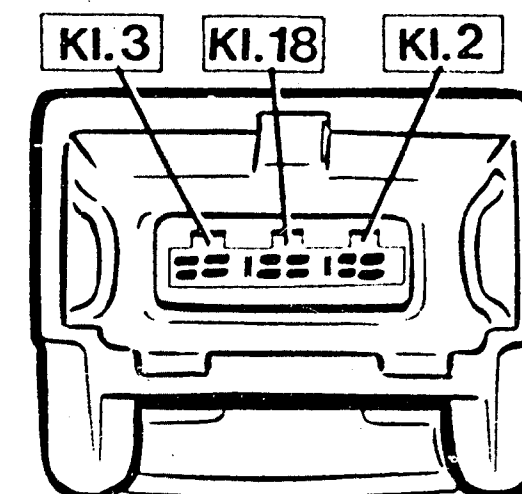
Open throttle valve approx. 2°.

Ohmmeter must indicate infinity  $\Omega$ .

Renew throttle-valve switch if resistance 0  $\Omega$ .



227 / 321



227 / 1103

Return to trouble-shooting chart B04

# TROUBLE-SHOOTING PROGRAM (16)

Check ignition basic setting.

Run warm engine at idle at  
800...900 min<sup>-1</sup> .

Throttle valve in idle position  
(idle contact closed).

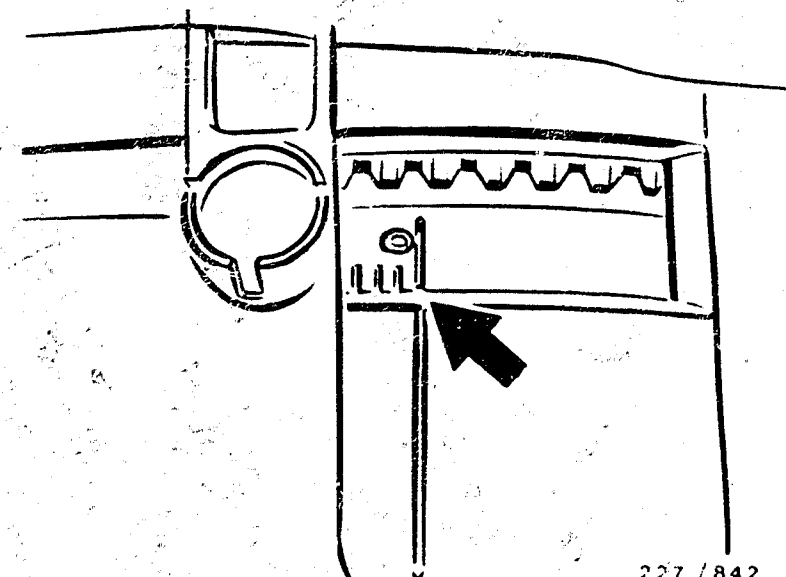
Aim lamp at ignition firing point  
mark.

Set value: 14 ± 1° before TDC.

Is set value attained?

N>

Turn ignition distributor until  
set value is attained.



Arrow = e.g. TDC mark

Return to trouble-shooting chart  
B04

C25

<=>

C26

<=>

# TROUBLE-SHOOTING PROGRAM (17)

Test peak-coil-current cutoff.

Connect voltmeter to ignition coil  
term. 15 (+) and term. 1 (-).

Switch on ignition.

Set value: voltmeter may briefly  
deflect for approx. 1 s.  
Voltmeter must return to 0 V.

Is set value attained?

N>

Renew EI-K control unit, trigger  
box and ignition coil.

Return to trouble-shooting chart  
B04

# TROUBLE-SHOOTING PROGRAM (18)

Check voltage, trigger box.

Unscrew trigger box with heat sink.

Push back rubber sleeve of trigger-box plug and connect voltmeter to term. 4 (+) and term. 2 (-).  
See picture.

Run engine at idle.

Set value: 12..14 V or max. 1 V below battery voltage.

Is set value attained?

N>

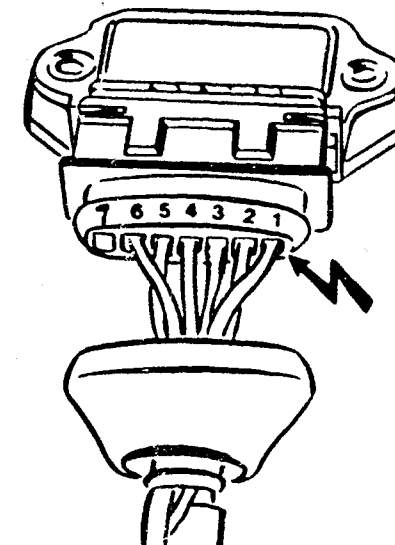
Disconnect negative and positive lead of battery.  
Detach trigger-box plug.  
Switch on ignition.

Check for contact resistance in following leads:

1. From battery negative terminal to trigger-box plug term. 2
2. From positive battery terminal to trigger-box plug term. 4

Contact resistance during testing of items 1 and 2 max. 0.3  $\Omega$  (take account of resistance of test prods/test lead).

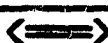
Eliminate contact resistances.



227 / 1292

Return to trouble-shooting chart  
B04

D01



D02



## TROUBLE-SHOOTING PROGRAM (19)

Test voltage supply of ignition coil.

Connect voltmeter to ignition coil term. 15 and vehicle ground. Run engine at idle.

Set value: equal to/greater than 10 V

Is set value obtained?

N>

Disconnect positive lead from battery; switch on ignition.

Check for contact resistance in leads between positive battery terminal and ignition coil term.15.

Contact resistance may be max. 0.3  $\Omega$  (take resistance of test prods and test leads into account)

Eliminate contact resistance.

Test primary voltage.  
(If MOT series present)

Connect oscilloscope (e.g. MOT 206) together with pulse-shaping circuit 1 684 463 154 to ignition coil as per operating instructions.

Note:

Incorrect measured value without pulse-shaping circuit.

Allow engine to idle.

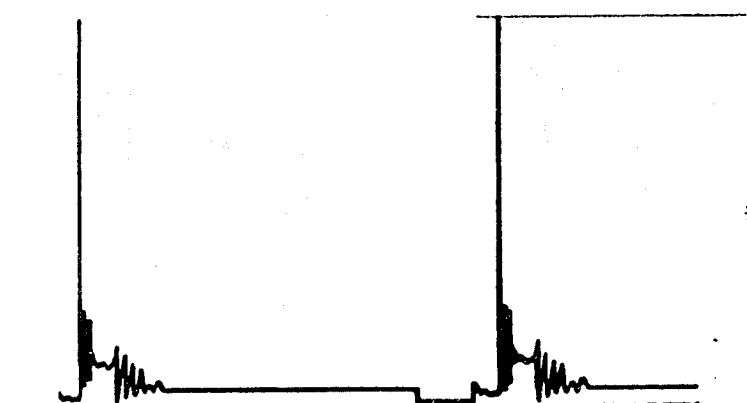
Set value: see picture/brief instructions

Is set value attained?

N>

Replace trigger box.

Return to trouble-shooting chart B04



227/957

# TECHNICAL BULLETIN

## DANGER OF ACCIDENT ON SEMI- CONDUCTOR IGNITION SYSTEMS

|22|  
VDT-I-227/102 En  
03.1981

Supersedes Feb. 3, 1976 edition

Please be sure to pass this bulletin together with VDE 0104/7.67 enclosed on to your employees for their attention.

The increased demands made on their ignition systems by modern engines, and the wish for freedom from maintenance, led some time ago to manufacturers starting to equip their vehicles with semi-conductor ignition systems as original equipment.

In most cases, the performance of nearly all makes of such systems is higher than that of conventional systems, and further improvements are to be expected. This means that semi-conductor ignition systems have reached the point where contact with "live" components or terminals (whether on the primary side or the secondary side) can prove fatal.

In this connection, we should like to point out to you that the laws valid in your country regarding work on high-voltage systems must be adhered to when working on, or testing, semi-conductor ignition systems.

As a matter of principle, when working on such ignition systems, the ignition is to be switched off.

Included in such work are the following operations:

- \* Connection of engine testing equipment (timing strobe, dwell-tach tester, ignition oscilloscope etc.)
- \* Replacement of ignition system components (spark plugs, ignition coil, ignition distributor, H.T. ignition cables etc.)

If it is necessary to switch on the ignition in order to test the system or make adjustments on the engine (to the carburetor, for instance), then lethal voltages are present throughout the entire system.

This means that the danger of accident exists not only at the individual components in the system (e.g. ignition distributor, ignition coil, trigger box, ignition harness), but also at the wiring harness (e.g. connection for the tachometer, diagnostic connector), on terminals, and on test equipment.

In addition, in the case of the capacitor-discharge ignition system (CDI), danger of accident is also present under the following circumstances:

- \* Operation of the trigger box without the ignition transformer.
- \* At the trigger box, (removed), relatively soon after it has been switched off (capacitor discharge).

Below is a typical terminal diagram of a semi-conductor ignition system, the dangerous locations being marked with high-voltage arrows.

We would point out that all semi-conductor ignition systems, even the older versions, are to be regarded as dangerous in the sense as defined by this bulletin.



## EFFECTS OF ELECTRICAL AND ELECTRONIC SYSTEMS ON HEART PACEMAKERS

VDT-I-227/107 En  
01.1981

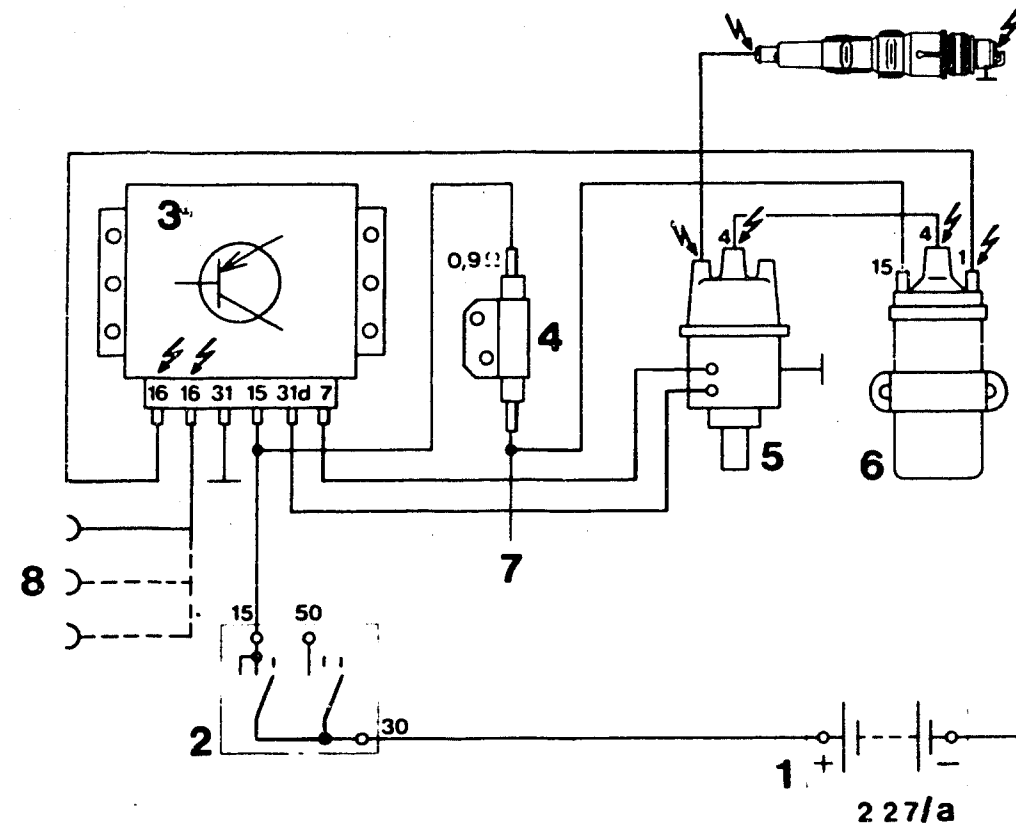
e.g. Ignition systems, Jetronic, Motronic, ABS

Please ensure that this Bulletin is passed  
on to your employees for their attention.

We have often been asked by some of our  
customers whether or not patients with heart  
pacemakers are endangered in any way by  
ignition systems. This theme was recently  
the subject of an examination carried out by  
the Ignition System Development Department of  
Robert Bosch GmbH in conjunction with Dr.  
Thull, lecturer at the Central Institute for  
Biomedical Technology at the University of  
Erlangen-Nürnberg and Biotronic GmbH & Co.  
of Berlin, a manufacturer of heart pacemakers.  
The magazine "Biomedizinischen Technik"  
(5/80) published the results.

The most important discoveries in this practice  
can be summarized from the examination report  
as follows:

1. Heart pacemakers corresponding to the  
latest state of the art are not affected  
by radiation (electromagnetic fields) from  
ignition systems.
2. With a stationary engine and the ignition  
switched off, the heart pacemaker is not  
affected by any part of the ignition system,  
even when unintentionally touched. Main-  
tenance work in the engine compartment, for  
example, can then be carried out without  
any danger.



- 1 = Battery
- 2 = Ignition/starting switch
- 3 = Trigger box
- 4 = Resistor
- 5 = Ignition distributor
- 6 = Ignition coil
- 7 = to starting motor term. 15a
- 8 = to tachometer connection  
or diagnostic plug  
or TD terminal

Published by:

Robert Bosch GmbH  
Division KH  
After-Sales Service Department for  
Training and Technology (KH/VSK)

Please direct questions and comments  
concerning the contents to our authorized  
representative in your country.

3. With the engine running or stationary with the ignition switched on, touching current-carrying parts of the ignition system, as well as parts of any other electrical system, presents a certain danger for everybody. The heart pacemaker can here be affected under certain conditions (voltage, current and frequency). Patients with heart pacemakers should therefore at all costs avoid touching current-carrying parts of electrical systems.

4. Furthermore, patients with heart pacemakers are more inclined to psychic shock effects than other people, even when they receive just a harmless electric shock, because many such patients are conscious of the increased danger to the cardiac activity.

We therefore consider it inadvisable for patients with heart pacemakers to be employed in workshops or on vehicles where ignition systems are being tested or repaired. If any members of your staff have heart pacemakers, please introduce the necessary measures.

We would like to add that heart pacemakers are not expected to be affected in any way by interference from other electronic products and systems which we manufacture, such as the Antiskid System (ABS), Jetronic, Motronic, because the much greater radiation intensity of the ignition systems examined in normal use has not caused any interference to heart pacemakers corresponding to the latest state of the art.

If you should receive questions on this matter from customers, please inform them accordingly.

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NEW DESIGNATIONS FOR IGNITION SYSTEMS

VDT-I-227/108 En  
01.1983  
Supersedes 5.1981 edition

The introduction of new ignition systems has made it necessary to reclassify all designations.

The designations listed below will be used immediately in KH workshop and sales literature.

Designation	Abbreviated code	Meaning	Switching	Ignition ctrl. and spark adv.	High-voltage dist.
Coil ignition	ZS (CI)	—	Mechanical (breaker points)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Transistorized coil ignition	TSZ-K (TCI-c)	K=breaker-triggered	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Trigger box with conventional circuit techniques	TSZ-I * (TCI-i)	I=Induction-type pulse gen.	Electronic (trigger box)	Mechanical (ignition dist.)	Mechanical (ignition dist.)
	TSZ-H (TCI-h)	H=Hall generator	Electronic (trigger box)	Mechanical (ignition dist.)	Mechanical (ignition dist.)

Designation	Abbreviated code	Meaning	Switching	Ignition ctrl. and spark adv.	High-voltage dist.
Transistorized ignition	TZ-I * (TI-i)	I=Induction-type pulse gen.	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
(Trigger box in hybrid technique)	TZ-H * (TI-h)	H=Hall generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Breakerless semi conductor ignition with or without knock control	EZ (EI) (EZ-K) (EI-k)	K=Knock control	Electronic (trigger box or control unit)	Electronic (control unit)	Mechanical (ignition distributor or high-voltage distributor)
Distributor-less ignition with or without knock control	VZ (FEI) VZ-K (FEI-k)	K=Knock control	Electronic (control unit)	Electronic (control unit)	Electronic (dual-spark ignition coil, or 1 ignition coil for each spark plug)

\* Note:

The ignition system can also be equipped with a DLS unit (digital idle stabilization) or with an ELS unit (electronic idle stabilization) or with an ESV unit (electronic ignition retardation).

## MOTOR VEHICLE SERVICE INFORMATION

INCORRECT DISPLAY OF ROTATIONAL SPEED VDT-I-Gen. 030 En  
AND DWELL ANGLE ONLY WITH TRIGGER 02.1981  
BOXES 0 227 100 .. (TCI-1, TCI-h)  
WITH CURRENT LIMITATION Supersedes ed. 6.1980

For additional information, see VDT-I Gen. 032 En

### 1. General

In comparison with conventional ignition systems, transistorized ignition systems with current limitation have different primary voltage characteristics. During the dwell period, the voltage at terminal 1 of the ignition coil may assume values from 1.5 V to battery voltage (or greater). This may lead to an incorrect display of rotational speed and dwell angle when testing the ignition system. However, there is no functional defect in the ignition system, and, for this reason, the trigger box must not be replaced. Incorrect displays may occur with the testers listed below:

MOT 001.00	Rotational-speed	KTE 001.00
001.01	display O.K. with	001.02
001.02	these testers	001.03
001.04		
002.00		

By now, the following vehicles may be fitted with breakerless ignition systems with current limitation:

Audi	(Bosch/Fairchild ignition system)	Mazda	(Mitsubishi ignition system)
BMW	(Bosch ignition system)	Mitsubishi	(Mitsubishi ignition system)
Citroen	(Delco ignition system)	Nissan	(Hitachi ignition system)
Fiat	(Delco ignition system)	Datsun	(Bosch ignition system)
Ford	(Delco ignition system)	Peugeot	(Bosch/Fairchild ignition system)
General Motors	(HEI ignition system)	VW	(Bosch transistorized ignition system for retrofitting)

0 227 100 920

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## 2. Test instructions

### 2.1 Rotational speed

Incorrect rotational-speed display can be recognized as follows:

If one starts at the idle speed and slowly increases the engine speed, then the incorrect display can be recognized by an abrupt reduction in the rotational-speed display (e.g. from  $2400 \text{ min}^{-1}$  to  $1200 \text{ min}^{-1}$ ).

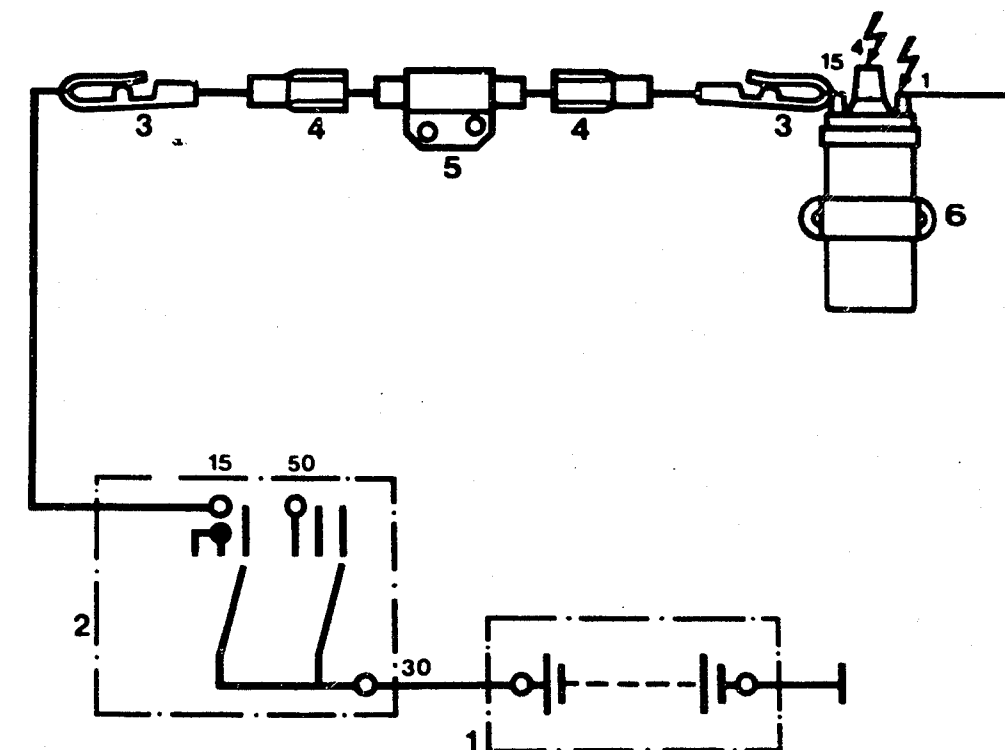
It is, however, possible to attain correct rotational-speed measurements:

Connect a ballast resistor of 0.9 or 1.0 Ohms (see Fig.) in series in the line to term. 15 of the ignition coil (take care not to cause a short circuit). After the rotational-speed measurement, the ballast resistor must be removed (otherwise starting difficulties and misfiring). Connect tester as per operating instructions.

### Suggestion for user manufacture

#### Required parts:

1 ballast resistor 0.9 Ohms	Part no. 0 227 900 002
or	
1 ballast resistor 1.0 Ohms	Part no. 0 227 900 101
2 blade receptacles	Part no. 1 901 355 881
e.g. approx. 0.2 m cable, 1.5 mm <sup>2</sup> e.g.	Part no. 6 210 150 150
2 insulated clips	Commercially available



- 1 = Battery  
2 = Ignition/starting switch  
3 = Terminals  
4 = Blade receptacle <sup>2 27/d</sup>  
5 = Series resistor  
6 = Ignition coil

Danger arrows: Warning: 400 V...25 KV

### 2.2 Dwell angle

The dwell angle is electronically controlled.  
The dwell angle is no longer measured.

### 2.3 Ignition timing

Is correctly indicated. Tester connections according to operating instructions.

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## MOTOR-VEHICLE SERVICE INFORMATION

### MOTORTESTER CONVERSION

VDT-I-Gen. 032 En

Incorrect indication of engine speed,  
dwell angle and ignition point  
only with trigger boxes

06.1980

0 227 100 .. (TCI-I, TCI-H) with current limitation

For additional information see

VDT-I-Gen. 030 of 06.1980

Concerns: Motortester EFAW 268

268 S 10

269

214 B

AE 2000

#### 1. General

Please arrange for above-quoted motor-testers in your workshop as well as at your customers (e.g. motor-vehicle workshops, petroleum companies, gas stations, vocational schools etc.) to be converted. Conversion is subject to payment and is performed by the K7 after-sales service of the responsible BG. The standard time is 15 work units (with installation of switch).

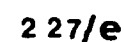
#### 2. Why convert motortesters?

Transistorized ignition systems with current limitation have a different primary-voltage characteristic from conventional ignition systems. During the dwell period, the voltage at terminal 1 of the ignition coil may assume values between 1.5 V and battery voltage (or greater), which, when checking the ignition system, may lead to an incorrect indication of engine speed and dwell angle and to incorrect triggering of the counter.

There is, however, no functional defect in the ignition system, and, for this reason, the trigger box must not be replaced. Since, with the above-listed motortesters, the timing strobe is triggered by the signal-path dwell-angle meter, this incorrect triggering also leads to incorrect flashing and thus to an incorrect display of the advance angle.

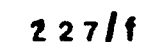
#### 3. Conversion measures

The situation is to be remedied by modifying the wiring of the testers so that the timing strobe is triggered by the clamp-on induction pickup and the pulse shaper stage.



In addition, a new line must be connected from pin 31 of printed board 11 to the other contact of the switch with change-over contact.

Arrow points to switch with change-over contact.



Arrow points to switch with change-over contact.

By fitting the switch with change-over contact in the front panel of the motortester, it is possible to switch over from standard ignition systems to those with current limitation. We recommend that the switch positions be marked correspondingly:  
e.g. "Standard" - "Current limitation".  
These conversion measures have already been published in the K7 information sheet KJF 28/7911.

#### 4. Test instructions

##### 4.1 Standard ignition systems

Switch position: "Standard".

All other tester connections as per operating instructions.

##### 4.2 Ignition systems with current limitation

Switch position: "Current limitation".

In order to trigger the timing strobe, the induction-type pulse generator (clamp-on pickup or red pickup) must always be connected during the measurement.

The selector switch for ignition systems built into the motortester must be switched to standard coil ignition (not to TCI) with these ignition systems.

All other tester connections as per operating instructions.

The dwell angle is electronically controlled. A measurement of the dwell angle is no longer performed.

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## MOTOR VEHICLE SERVICE INFORMATION

### TESTS ON ELECTRONIC IGNITION SYSTEMS (TCI, TI) TESTER INSTRUCTIONS

VDT-I-Gen. 035 En  
03.1981

The following tests are listed in older and current Tester operating instructions or in "Trouble-shooting with the oscilloscope":

- \* "Separate ignition coil test"  
(Concerns EFAW 213, 214, 268, AE 2000)
- \* Calculating the "ignition voltage reserve"  
(Concerns EFAW 213, 214, 268, AE 2000 and MOT series).
- \* "Intensified insulation test"  
(Concerns EFAW 213, 214, 268, AE 2000 and MOT series).

Nowadays, transistorized ignition systems deliver more than 30,000 V secondary voltage.

To avoid damage to ignition coil, ignition cable and ignition distributor by voltage flashovers, the tests listed above should not be carried out on transistorized ignition systems.

The contents of this Service Information has already been published in the K7 Information K7-VJF 17/8012.

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